

**Biodiversity Inclusive Environmental Impact Assessment
(B-EIA) &
Participatory Social Impact Assessment (p-SIA)
Tropical Aquaculture Investment Ltd, Savanna Area,
Stann Creek District, Belize**

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**COMPETE
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Contents

1	Executive Summary.....	6
2	Introduction to the Biodiversity-inclusive Environmental Impact Assessment.....	7
3	Introduction to the participatory Social Impact Assessment	7
4	Methodology.....	8
	A second round of community meetings was organized in the first week of November 2014 to present the villagers with the draft p-SIA document, to receiving their response on the proposed impact and risk management. See.....	10
5	Description of the Tropical Aquaculture Investment Shrimp Farm and its effects	13
6	B-EIA components.....	15
	6.1. Siting in Protected Areas.....	15
	6.2. Siting in Mangrove Ecosystems.....	16
	6.3. Siting in Critical Habitats	19
	6.4. Endangered species	22
	6.5. Biological Corridors	24
	6.5.1. Actions.....	26
	6.6. Salt Water Intrusion	27
	6.6.1. Actions.....	29
	6.7. Predator Control	30
	6.7.1. Actions.....	34
	6.8. Introduction of non-native species.....	35
	6.8.1. Flood Risk as a result of hurricanes.....	35
	6.8.2. Regular flooding.....	37
	6.8.3. Escapes via waterways.....	38
	6.8.4. Actions.....	38
7	Identification of a Governmental Entity	40
8	Identification of a civil society organization	40
9	Identification of the Tropical Aquaculture Investment Shrimp Farm stakeholders	40
	9.1. Local communities: Independence, Placencia village and Seine Bight.....	42
	9.1.1. Independence	43
	9.1.2. Placencia Village and Seine Bight.....	47
	9.2. Neighbouring Land Owners	49

9.3. Users of the same natural resources	51
9.4. Non-Governmental Organization: Southern Environmental Association	51
9.5. Department of Rural Development	51
9.6. National Integrated Water Resources Authority	51
9.7. Department of Environment.....	52
9.8. Social Investment Fund	52
10 Deeper research needed on important impacts on the physical, biological and social environment.....	52
11 Proposed adaptations at farm set-up	55
11.1. Maximize positive impacts:.....	55
11.1.1. Employment:.....	55
11.1.2. Contributions to local communities, organizations, private persons:.....	55
11.1.3. Website BSGA	55
11.2. Minimize the negative impacts:.....	55
11.2.1. Water quality monitoring	55
11.2.2. Develop a grievance procedure	55
11.2.3. Future developments at the Tropical Aquaculture Investment farm:.....	56
11.2.4. Website BSGA	56
12 Conflict Resolution Policy.....	56
13 Agree on impacts and measures to address them	57
14 Conclusions and agreements	57
15 Appendices.....	59
15.1. Appendix 1: Transcript first meeting consultant and management TAI	59
15.2. Appendix 2a: Transcript of meetings with Independence Village stakeholders	61
15.3. Appendix 2b: Transcript meetings with Placencia Village stakeholders.....	68
15.4. Appendix 2c: Transcript meetings with Seine Bight stakeholders.....	78
15.5. Appendix 3: Transcript Phone Calls with land owners.....	86
15.6. Appendix 4: Consultations with the Department of the Environment.....	89
15.7. Appendix 5: Consultation with Ministry of Labour, Local Government, Rural Development, NEMO and Immigration.	91
15.8. Appendix 6. Consultation with Social Investment Fund	91
15.9. Appendix 7. Consultation with the National Integrated Water Resources Agency.....	91

15.10. Appendix 8. Escape Recovery Plan	92
15.11. Appendix 9. List of species of conservatism concern in Belize	94
15.12. Appendix 10. Flora and Fauna species list	98
15.13. Appendix 11. Wildlife record wildlife cameras	113
15.14. Appendix 12. Bird observations	115
15.15. Appendix 13. Wildlife Monitoring Protocol	121
15.16. Appendix 14. Complaint Resolution Policy Framework.....	122
15.17. Appendix 17. Sequence of activities	134
15.18. Appendix 17. CV'S of B-EIA & p-SIA team	137

Abbreviations

\$	dollar
%	percentage
ASC	Aquaculture Stewardship Council
BAL	Belize Aquaculture Limited
B-EIA	Biological Environmental Impact Assessment
BERDS	Biodiversity and Environmental Resource Data System
BSGA	Belize Shrimp Growers Association
BWSL	Belize Water Services Ltd.
CD	Conservation Dependant
cm	centimeter
DoE	Department of Environment
ECP	Environmental Compliance Plan
EIA	Environmental Impact Assessment
etc.	Etcetera
ft.	Feet
GIS	Geographical Information System
GoB	Government of Belize
ha	hectare(s)
IAIA	International Association for Impact Assessments
IUCN	Union for Conservation in Nature
m	meter
m ²	square meter(s)
N.A.	Not applicable
N/A	Not applicable
NGO	Non-Governmental Organization
NIWRA	National Integrated Water Resource Agency
NT	Near Threatened
OAS	Organization of American States
PA	Protected Area
PASPO	Protected Areas Systems Plan Office
pm	post meridiem (afternoon)
PRTR	Pollutant Release Transfer Registry
p-SIA	participatory Social Impact Assessment
SEA	Southern Environmental Association
ShAD	Shrimp Aquaculture Dialogue
SIF	Social Investment Fund
TAI	Tropical Aquaculture Investment Ltd.
TV	television
WWF	World Wide fund for Nature (World Wildlife Fund)

1 Executive Summary

Tropical Aquaculture Investment Ltd. (TAI) is a new shrimp farm (first production in 2013) is located on a medium sized and parcel (total about 550 acres) in the Savannah area, Stann Creek district. A number of other large land parcels, some also under ownership of TAI but still undeveloped, and another shrimp farm under construction (TexMar II), surround the farm. In the south it is bounded by wetlands and a large inner lagoon that is part of the Placencia Lagoon system.

TAI operates a semi-intensive shrimp farming system with densities of 35 shrimps/m². The TAI production ponds receive their water from the Flour Camp Lagoon, a large settlement pond is about to be finished. The TAI operation is completely in a freshwater environment, but no signs of damaged vegetation as result of salt intrusion were observed. Semi-intensive shrimp farms produce only low levels of effluents, in combination with the relatively large settlement pond and proper pond management, the release of nutrients into the Placencia Lagoon should be minimal.

The TAI farm has about 38 acres of mangrove on the property, but the construction of the ponds has not led to mangrove destruction. There is no vegetation system on the TAI farm property that contributes to the broadleaf-mangrove connectivity.

Fieldwork by the consultants in 2014, revealed very low numbers and no predatory species at all, as a consequence, predator control is probably a low priority at Tropical Aquaculture.

Primary stakeholder communities for TAI. are Independence, Seine Bight and Placencia While SEA is a local NGO that should be considered a key stakeholder. Stakeholder community meetings were held in the three villages by the consultant team. Overall, TAI was never explicitly mentioned as the cause of negative impacts during these meetings. However, an interview with a direct neighbour revealed some small issues that were quickly resolved after these were addressed with farm management.

Negative comments during the community meetings focussed principally on the risk of pollution of the Placencia Lagoon as the result of shrimp farm effluent in generally, without incriminating a particular farm. There are no urgent social issues outstanding with regards to Tropical Aquaculture Investement. But TAI has not yet a grievance procedure developed.

2 Introduction to the Biodiversity-inclusive Environmental Impact Assessment

The International Association for Impact Assessments (IAIA) (1999) defines an Environmental Impact Assessment as: “The process of identifying, predicting, evaluating and mitigating the biophysical, social and other relevant effects of development proposals prior to major decisions being taken and commitments made.” (International Association for Impact Assessment, <http://www.iaia.org>).

The B-EIA process seeks to obtain the best possible biodiversity outcomes from land use changes. It is important that all interested parties understand the process by which the assessment has been made and how and by whom any actions needed to deliver biodiversity objectives will be implemented and monitored. The B-EIA must provide reliable information about, and interpretation of, the ecological implications of the project from its inception to its operation and, where appropriate, its decommissioning. The B-EIA process also seeks to add value to other Shrimp Aquaculture Dialogue (ShAD) Standards and contribute to demonstrating compliance, while taking into account specific local landscape conditions.

“The benefits of B-EIAs to shrimp farmers are that they will obtain a deeper understanding of the importance of the local ecosystem to the sustainability and success of their operation and will be able to identify which elements of their surrounding ecosystem are important. Farmers will also be able to determine which ecosystem elements need to be maintained to reduce risks of conflict with wider societal stakeholders and be able to demonstrate good practice” (ASC Shrimp Standards Version1.0/ March 2014)

3 Introduction to the participatory Social Impact Assessment

A participatory Social Impact Assessment (p-SIA) is an assessment of positive and negative consequences and risks of planned or on-going projects, here a shrimp farm development. The p-SIA is undertaken in such a manner that all stakeholder groups have input in the process, results, and outcome of such an assessment, and those steps taken and information gathered is openly accessible to all. Its primary purpose is to bring about a more sustainable and equitable biophysical and human environment.

The improvement of the social well-being of the wider community should be explicitly recognized as an objective of the farm and, as such, should be an indicator considered by any form of assessment.¹

The effect of a p-SIA can be mutually beneficial:

- maximize positive and minimize negative impacts to the ‘surrounding’ community and their social wellbeing and livelihoods
- reduced costs and risks to the farm operation due to the increased comfort with and absence of conflict with the surrounding community

¹ ASC Shrimp Standards, version 1.0/March 2014. Appendix II

4 Methodology

See also Appendix 17. Sequence of activities

The methodology of this **B-EIA** is based on the *Basic B-EIA methodology* as formulated in Appendix I in the ASC Shrimp Standard version 1.0/March 2014. These include the following standards:

- 2.1.1. Farm owners shall commission a participatory BEIA and disseminate results and outcomes openly in locally appropriate language. The BEIA process and document must follow the outline in Appendix I.
- 2.2.2. Allowance for siting in mangrove ecosystems and other natural wetlands or areas of ecological importance as determined by the B-EIA or national/state/local authority plans/list.
- 2.3.1. Allowance for siting farms in critical habitats of endangered species as defined by the IUCN Red List, national listing processes or other official lists.
- 2.3.2. Maintain habitats critical for endangered species within farm boundaries and implement protection measures of such areas.
- 2.4.1. Coastal barriers: Minimum permanent barrier (or natural) between farm and marine environments
- 2.4.2. Riparian buffers: Minimum width of permanent native and natural vegetation between farms and natural aquatic/brackish environments
- 2.4.3. Corridors: Minimum width of permanent native and natural vegetation through farms to provide human or native wildlife movement across agricultural landscapes.
- 2.5.3. Water-specific conductance or chloride concentration in freshwater wells used by the farm or located on adjacent properties
- 2.5.4. Soil-specific conductance or chloride concentration in adjacent land ecosystems and agricultural fields
- 5.2.1. Allowance for intentional lethal predator control of any protected, threatened or endangered species as defined by the International Union for Conservation of Nature (IUCN) Red List national listing processes, or other official lists
- 5.2.2. Allowance for use of lead shot and select chemicals for predator control
- 6.1.2. Prevention measures in place to prevent escapes at harvest and during grow-out include:
 - A. Effective screens or barriers of appropriate mesh size for the smallest animals present; double screened when non- indigenous species

- B. Perimeter pond banks or dykes are of adequate height and construction to prevent breaching in exceptional flood events.
- C. Regular, timely inspections are performed and recorded in a permanent register
- D. Timely repairs to the system are recorded
- E. Installation and management of trapping devices to sample for the existence of escapes; data is recorded
- F. Escape recovery protocols in place

The methodology of this p-SIA is based on the *Basic p-SIA methodology in seven steps* as formulated in Appendix II in the ASC Shrimp Standard version 1.0/March 2014.

- 1 Prepare a general description of the Tropical Aquaculture Investment Shrimp Farm
- 2 Determine which village(s) can be considered stakeholders to the Tropical Aquaculture Investment Shrimp Farm and its operations; the selection of this/these village(s) will be based on proximity to the farm and physical connectivity with the farm, see Map 10.
- 3 Determine which land parcels are neighbouring the Tropical Aquaculture Investment Shrimp Farm, or are within 100 yards from the boundary of the farm, see Map 12.
- 4 Determine which Governmental Ministry is responsible of representing the interests of the rural communities.
- 5 Determine which civil society organization is active in the wider area and could function as a repository of the p-SIA reports
- 6 Meeting with a Tropical Aquaculture Investment representative took place on June 24, 2014, to introducing herself and the p-SIA process. A short interview was conducted to learn more about the relation of the farm management with the local community. The transcript of this meeting was forwarded to the management of the TAI, to allow them to make corrections and additions. No changes were received and the minutes were accepted by the management as they were. The transcript of this meeting is attached in Appendix 1.
- 7 A meeting with the Independence villagers was organized on July 15, 2014. The public was informed of the upcoming meeting by Radio Love FM announcements (starting in the week of July 7, 2014), TV advertisements (starting in the week of July 7, 2014); posters hang at critical points in the village and pamphlets distributed amongst the population (July 8, 2014). The meeting was held at the community centre, 12 persons participated in the event. See Appendix 2a for the transcript of the meeting. One person, who was not able to attend the meeting, expressed his concerns by email. This concern was included in the minutes

A second and a third community were made in Placencia (21 July 2014) and Seine Bight (22 July 2014) with resp. 12 and 7 participants. Transcripts of these meeting are in Appendix 2b and 2c.

8 Electronic copies of the minutes were distributed by email; the attendants were invited to contact the consultant to inform her about corrections or additions that had to be made. One comment was received and the comment was incorporated in the minutes. Attendants of the meeting and others, who showed an interest, were also informed about the website where all pertinent documents regarding the p-SIA process and ASC general information are made available.

9 Final copies of these minutes were posted on the website.

<http://www.biological-diversity.info/shrimpfarms.htm>.

This is a temporary website, operated during the p-SIA process.

10 Neighbouring land owners that were identified by Tropical Aquaculture Investment management were interviewed by phone or email by consultant or her assistants in July and August 2014. Overview of the outcome of these interviews is presented in Appendix 3.

11 A list of actual and potential impact of the Tropical Aquaculture Investment Shrimp Farm and its operations, as came forward during the community meetings and landowners' interviews, were shared with the Tropical Aquaculture Investment management. In cooperation with the farm management an impact and risk management was proposed.

12 The draft p-SIA was submitted to the farm management for their feedback

A second round of community meetings was organized in the first week of November 2014 to present the villagers with the draft p-SIA document, to receiving their response on the proposed impact and risk management. See

- 13 Appendix 2a: Transcript of meetings with Independence Village stakeholders for the minutes of the meetings
- 14 p-SIA report finalized in November 2014

TABLE 1. METHODOLOGY OF THE P-SIA PROCESS

Tropical Aquaculture Investment SHRIMP FARM			
Methodology steps	Activity	Date of meetings	Documentation
1	Prepare a general description of the farm		Table 2
2	Selection village(s)		Map 10
3	Identifying land owners		Map 12
4	Identifying Governmental Entity		N.A.
5	Identifying civic society organization		N.A.
6	Meeting with TAI management	24 June 2014, comments were received on July 4, 2014, and incorporated in the minutes	Appendix 1: transcript
7	Meeting with community members in Independence	15 July 2014	Appendix 2a
	Meeting in Placencia Village	21 July 2014	Appendix 2b
	Meeting in Seine Bight	22 July 2014	Appendix 2c
8	Electronic copies of the minutes were made available in Independence , Placencia and Seine Bight for reviewing	From 17 July 2014 on	
9	Final version of the minutes were posted on the website	21 July 2014	Appendix 2a, 2b and 2c: transcript meetings incl. list attendants per meeting
10	Interview landowners	July, August 2014	Appendix 3: overview outcome interviews
11	A list of actual and potential impacts of the TAI shrimp farm operations was shared with the management	September 1, 2014	
12	Draft p-SIA was submitted to farm management	September 1, 2014	
13	Draft p-SIA presented to the Independence, Seine Bight and Placencia villages and comments collected during a weeklong review period	November 4 and 5, 2014	See appendix 2 for transcripts and lists of attendees per meeting
14	Final p-SIA presented to TAI management	November 2014	

5 Description of the Tropical Aquaculture Investment Shrimp Farm and its effects

Tropical Aquaculture Investment is located in the Savannah area, north of Independence village, in the Stann Creek district. TAI is a medium size landholding surrounded by land parcels; some owned TAI but not yet developed. The land north of TAI is owned by the Northern Fishermen Coop in Belize City. West, on the other side of the road is owned by Steve Cristensen, south west by Percival Neal, and the remainder in the south and east is also owned by TAI but not developed for shrimp farming. Residents from local communities (the nearest being Placencia Village, Seine Bight and Independence) may have used the land for recreational hunting but this particular area has a low biodiversity as well as low biomass production and as a result there is little to hunt.

Overview of the infrastructure of the Tropical Aquaculture Investment Farm and its operations is presented in

TABLE 2. DESCRIPTION OF TROPICAL AQUACULTURE INVESTMENT FARM

Features and processes TAI	Description of TAI.
	<p>Description according to:</p> <ul style="list-style-type: none"> • The ECP (2011) TAI • Pond information derived from the GPS mapping of the shrimp farms, report July 2014 • Report Polanco: Environmental Management Practices • B-EIA consultant: ecosystems mapping
Name Farm	Tropical Aquaculture Investment Limited Contact address: Stann Creek district
Location, physical	Old Alabama Road Area Stann Creek district
EIA	NA
ECP	18 November 2011
Size of the property	Total according to GIS mapping by B-EIA consultant: 212.9 hectares (553.2 acres)
Size ponds	GIS mapping report: <ul style="list-style-type: none"> • Eight production ponds of approx. 5 hectares each (total 42.7 ha) • One sedimentation pond of 2.48 ha • One reservoir of 1.04 ha
Description ponds	ECP: Ponds will be unlined

Features and processes TAI	Description of TAI.
	Slopes berms will be maintained at a 1:3 ratio (vertical:horizontal) Outside of the slopes will be seeded with grass
Constructed canals and dykes	Material excavated from the ponds and canals will be used to construct the dykes
Shrimp density (shrimp per sq. meter)	Polanco: Semi-intensive technology: 35 shrimp/m ²
Buffer zones	ECP: The required 66 ft. vegetation reserve surrounding all water bodies (from the high water mark) will remain in its natural state Only enough vegetation will be cleared for the construction of all ponds, other farm infrastructure and buildings Avoid excessive alteration of mangrove vegetation
Habitat conversion	About 29% of the natural vegetation is converted to ponds, waterways, buildings and other farm uses
Habitat natural	About 71% of the natural vegetation remained in natural state
Intake fresh water	Polanco: TAI has two wells, only one is used. This well also provides fresh water to TEXMAR 2.
Intake salt water	Polanco: intake salt water from the Flour Camp Creek
Pump houses	GIS mapping report: One pumping station is located between the two southern most production ponds
Effluent/sedimentation treatment system: production ponds	One sedimentation pond is located east of the production ponds, surface area 2.84 ha
Tertiary treatment wastewater	In 2014, TAI had 15.3 hectare (37.8 acres) mangrove remaining on its property.

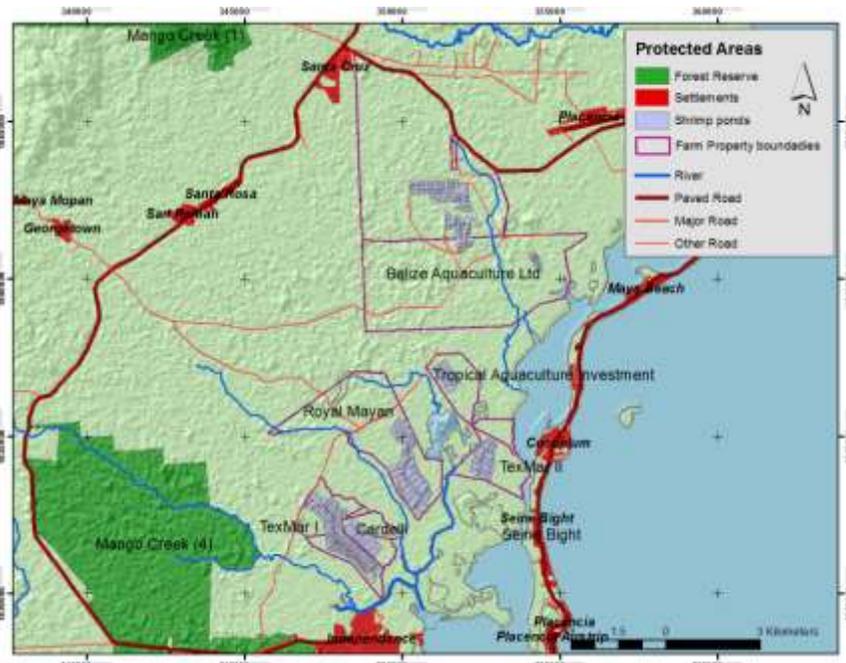
6 B-EIA components

6.1. Siting in Protected Areas

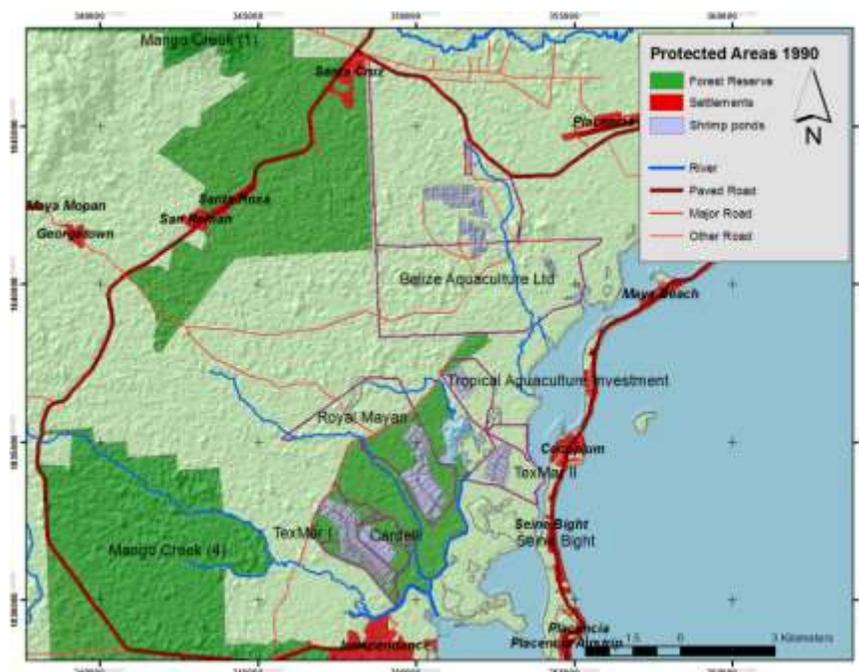
This follows ASC Standard 2.2.1 *Allowance for siting in Protected Areas (PAs)*.

Tropical Aquaculture Investment Farm is not situated on a protected area. The nearest protected area is Mango Creek Forest Reserve (IV), a 4,763 ha (11,770 acre) area managed by the Belize Forest Department for the extraction of pine.

However, TAI is partially located on what used to be the Mango Creek (III) Forest Reserve, equally an area managed by the Forest Department for the extraction of pine timber. Mangrove Creek (III) has been de-reserved after 1990.



MAP 1. NEARBY PROTECTED AREAS



MAP 2. PROTECTED AREA SITUATION IN 1990 (BEFORE THE FARM WAS ESTABLISHED)

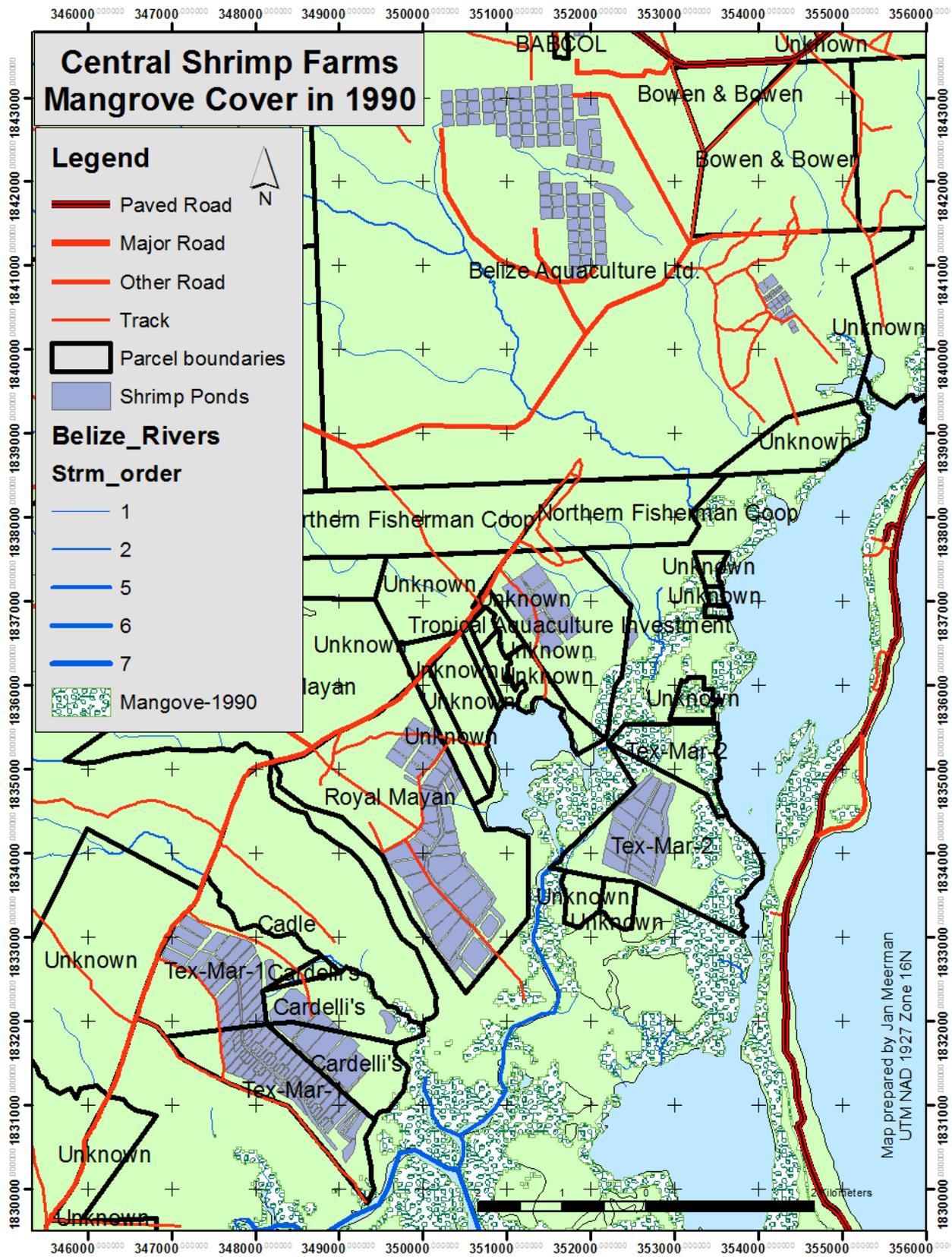
6.2. Siting in Mangrove Ecosystems

This follows ASC Standard 2.2.2: *allowance for siting in mangrove ecosystems and other natural wetlands or areas of ecological importance as determined by the B-EIA or national/state/local authority plans/list.*

A remote sensing analysis revealed that little mangrove exists within the boundaries of Tropical Aquaculture Investment. Most of this is located along the eastern fringes of the property. Mangrove is abundant along the small Creeks and along the coastal lagoons immediately east of the property, much if not all of which is government land. In total there is approximately 15 hectare (38 acres) of mangrove within the Tropical Aquaculture Investment boundaries (Situation July 2014).

An analysis of 1990 baseline data² revealed that the current mangrove extent has not significantly changed since then (Map 3 & 4). Consequently, Tropical Aquaculture Investment has not caused any measurable mangrove loss.

² GRAY, D.A., ZISMAN, S.A. AND CORVES, C. (1990). Final report - mapping the mangroves of Belize. 33pp. Department of Geography, University of Edinburgh. UK.



MAP 4. HISTORICAL EXTENT OF MANGROVE AROUND THE CENTRAL SHRIMP FARMS

6.3. Siting in Critical Habitats

This follows ASC Standard 2.3.1: *allowance for siting farms in critical habitats of endangered species as defined by the IUCN Red List, national listing processes or other official lists.*

The National Protected Area Policy and Systems Plan's gap analysis³ classified Belize's ecosystems and attempted to establish whether each ecosystem was sufficiently represented in the Belize Protected Areas system.

TABLE 3. ECOSYSTEMS AND LAND USES FOUND AT TROPICAL AQUACULTURE INVESTMENT

ECOSYSTEM	ACRES	HECTARES
Short-grass savannah with scattered trees and/or shrubs	202.6	82.0
Aquaculture: Fish ponds and shrimp farms	159.1	64.4
Caribbean mangrove forest; mixed mangrove scrub	37.8	15.3
Deciduous broad-leaved lowland shrubland, poorly drained	1.6	0.6

Table 3 presents a calculation⁴ of the ecosystems found on Tropical Aquaculture Investment. The most significant ecosystem present at Tropical Aquaculture Investment is:

VA2a(1)(2) Short-grass savannah with scattered trees and/or shrubs (Lowland savannah) has a national target of 40% but only 19% is actually within protected areas. As such, the short grass savannah is under-protected within Belize. As it happens, this ecosystem is the preferred ecosystem type for shrimp farm development in Belize!

The short grass savannahs of Belize occupy almost 10% of the land area, furnishing distinctive landscapes of ecological and economic value. They are the most northerly example of lowland savannahs in the Americas. Whereas upland savannahs of Central America have been the subject of numerous studies of plant diversity, the lowland savannahs had received little attention. Lowland savannahs in Belize are threatened by a combination of human pressures (notably agriculture and aquaculture) and by climate change⁵.

Savannahs were thought to be species poor, yet recent research has found more than 950 plant species in the lowland savannah, or approximately 28% of the nation's flora as recognised by Balick et al. (2000). 380 of these are savannah specialists. Of the 41 vascular plant species reported by Balick et al. (2000) as

³ Meerman J. C. 2005 Protected Areas System Assessment & Analysis: Gap Analysis; NPASP – 27 pp.

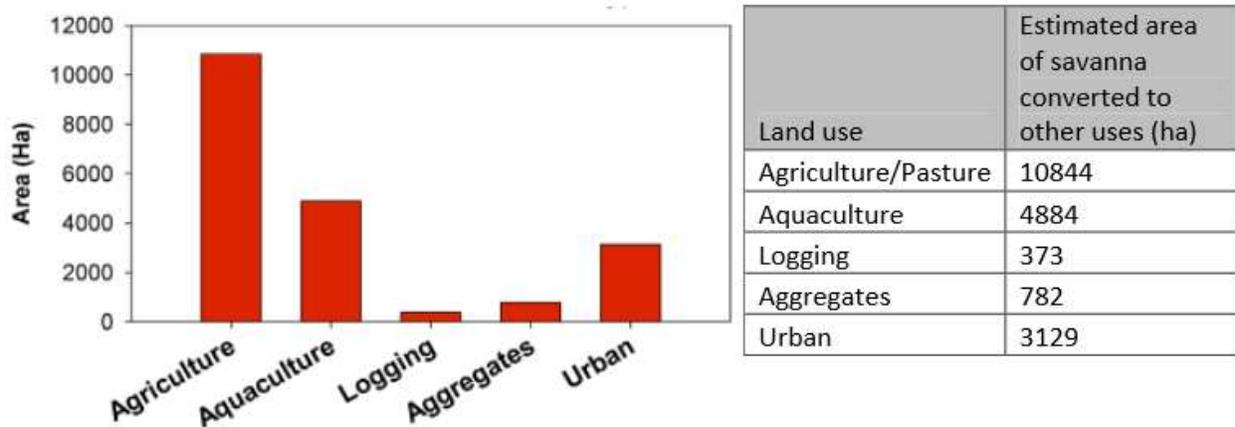
⁴ Includes the area recently acquired and covered by the new ponds, but additional land purchases are being contemplated.

⁵ BTFS, 2012. Results from Darwin Initiative Project 17-022 and the implications for savanna conservation. Progress report 78 pp.

endemic to Belize 18 (44%) are recorded in the lowland savannah. Whilst some savannah plants are widespread, others (including some endemics) show localized distributions.

A plant species list was produced based on the Biodiversity and Environmental Resource Data System for Belize (BERDS) <http://www.biodiversity.bz> augmented with direct observations from the field. See Appendix 10 for a complete list of species recorded from the project area. This lists the species found on and immediately around the eight ASC participating shrimp farms in order to get a better appreciation of the species that occur at a landscape level. See Map 5 for the collection points of the biodiversity data.

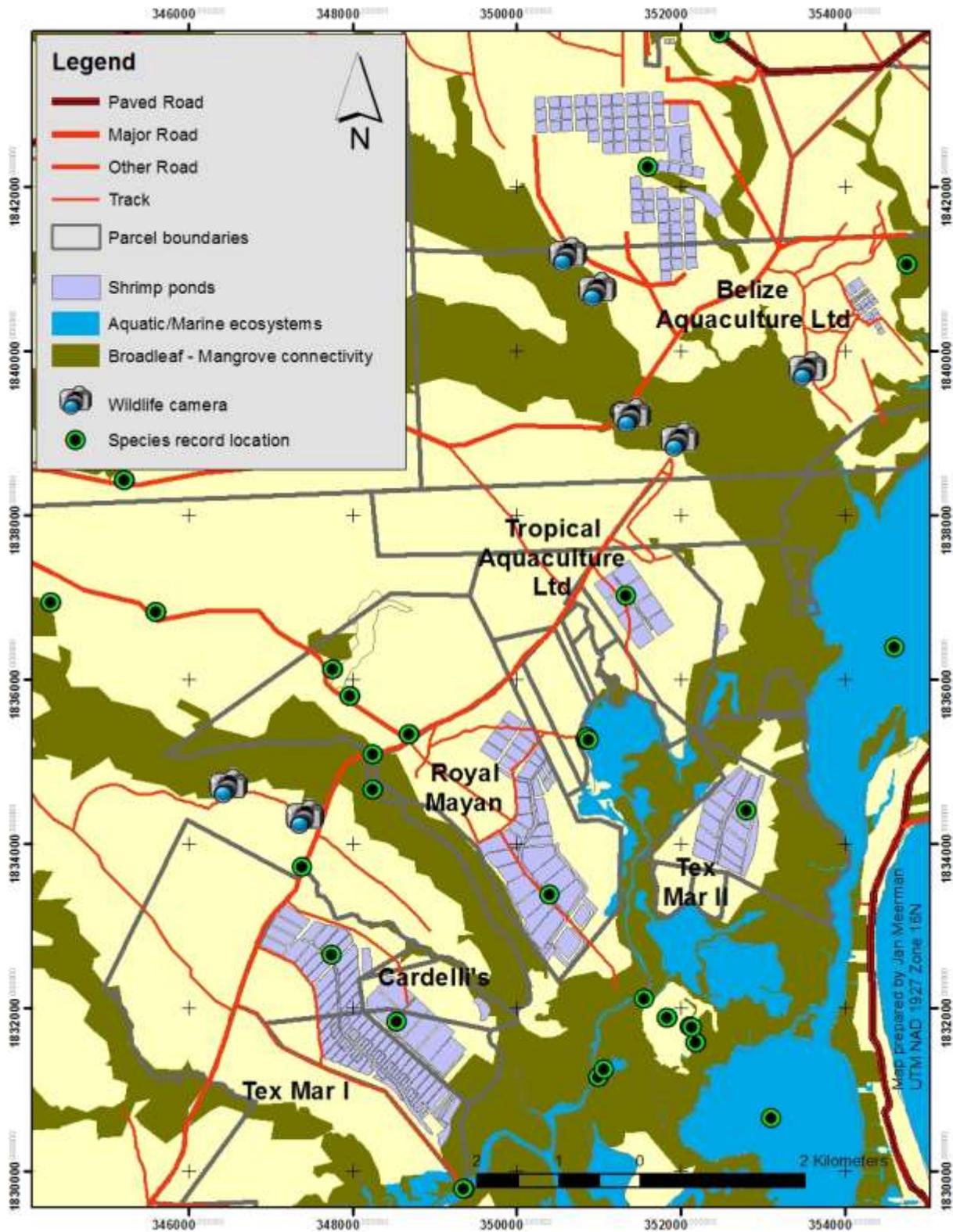
TABLE 4. CAUSES OF CONVERSION OF SAVANNAH ECOSYSTEMS⁶



As a habitat for endangered animal species, savannahs are generally not considered a critical habitat as most species are wide ranging.

More important for wildlife is broad leaf forest. This is generally considered to be more species rich. The broad leaf forest is represented on Tropical Aquaculture Investment as “Deciduous broad-leaved lowland shrubland, poorly drained”. This ecosystem is vital to the maintenance of biological corridors, not just on the Tropical Aquaculture Investment, but contributes to corridor functioning of all the centrally located shrimp farms. However the amount of this ecosystem present on TAI is minute and not of significance at a national or even regional scale.

⁶ BTFS, 2012. Results from Darwin Initiative Project 17-022 and the implications for savanna conservation. Progress report 78 pp



MAP 5. BROAD-LEAF - MANGROVE CONNECTIVITY IN THE CENTRAL SHRIMP FARMS AT LANDSCAPE LEVEL. TROPICAL AQUACULTURE INVESTMENT NEAR THE MIDDLE OF THE MAP

6.4. Endangered species

This follows ASC standard 2.3.2: *Maintain habitats critical for endangered species within farm boundaries and implement protection measures of such areas.*

Belize does not have an official protected, threatened or endangered species list as defined by the International Union for Conservation of Nature (IUCN) Red List, but there an officious national listing processes has taken place during the 2005 National Protected Areas Policy and Systems Plan Formulation⁷. The list produced there is based on the then IUCN red list but takes into account national priorities. This list is reproduced in Appendix 9.

In order to establish which of these species actually occur on the shrimp farms or in their immediate surroundings (landscape scale), a variety of methods was adopted:

1. Study existing databases, these being :
 - a. The Biodiversity and Environmental Resource Data System for Belize (BERDS)
<http://www.biodiversity.bz>
 - b. eBird <http://ebird.com>
2. The use of wildlife cameras in broad-leaf forest corridors of the general are of the 5 Central Shrimp Farms (considering landscape context). A total of 3 camera locations from June 2 to September 3, 2014. See Map 5 for locations.
3. Direct observations, mostly of birds during the various field visits.



FIGURE 1. WILDLIFE CAMERA AS OPERATED AT THE CENTRAL SHRIMP FARMS

⁷ Meerman, J. C. 2005. Belize Protected Areas Policy and System Plan: RESULT 2: Protected Area System Assessment & Analysis, National List of Critical Species Report to the Protected Areas Systems Plan Office (PASPO) 8pp.



Brouket Deer



Paca (Gibnut)



Four-eyed Opossum



Green Iguana



Great Curassow with chicks



Jaguar



Armadillo



Coati

FIGURE 2. WILDLIFE PHOTOGRAPHED WITH WILDLIFE CAMERAS IN THE CENTRAL SHRIMP FARM AREA CORRIDORS. SEE MAP 5 FOR LOCATIONS OF CAMERAS

In total 21 species of wildlife were recorded on the camera's including 3 species of conservation concern (Jaguar, Great Curassow, Moscovy Duck). A full list is presented in Appendix 12. Based on these short term monitoring efforts the Silver Creek/Santa Maria Creek corridor is richer in wildlife, which is according to expectations since it is much wider.

TABLE 5. WILDLIFE CAMERA RESULTS

Records	Jenkins Creek Corridor	Records	Silver Creek/ Santa Maria Corridor
11	Paca	16	Brown Four-eyed Opossum
8	Agouti	11	Great Curassow
8	Nine-banded Armadillo	9	Paca
7	Mouse Opossum	8	Gray Fox
3	White-nosed Coati	8	Green Iguana
1	Jaguar	6	White-tailed Deer
		3	Bare-throated Tiger Heron
		3	Gray-necked Wood-Rail
		2	Nine-banded Armadillo
		2	Red-Brocket Deer
		1	Clay-colored Trush
		1	Hawk
		1	Kinkajou
		1	Moscovy Duck
		1	Ruddy Quail Dove
		1	White-nosed Coati

6.5. Biological Corridors

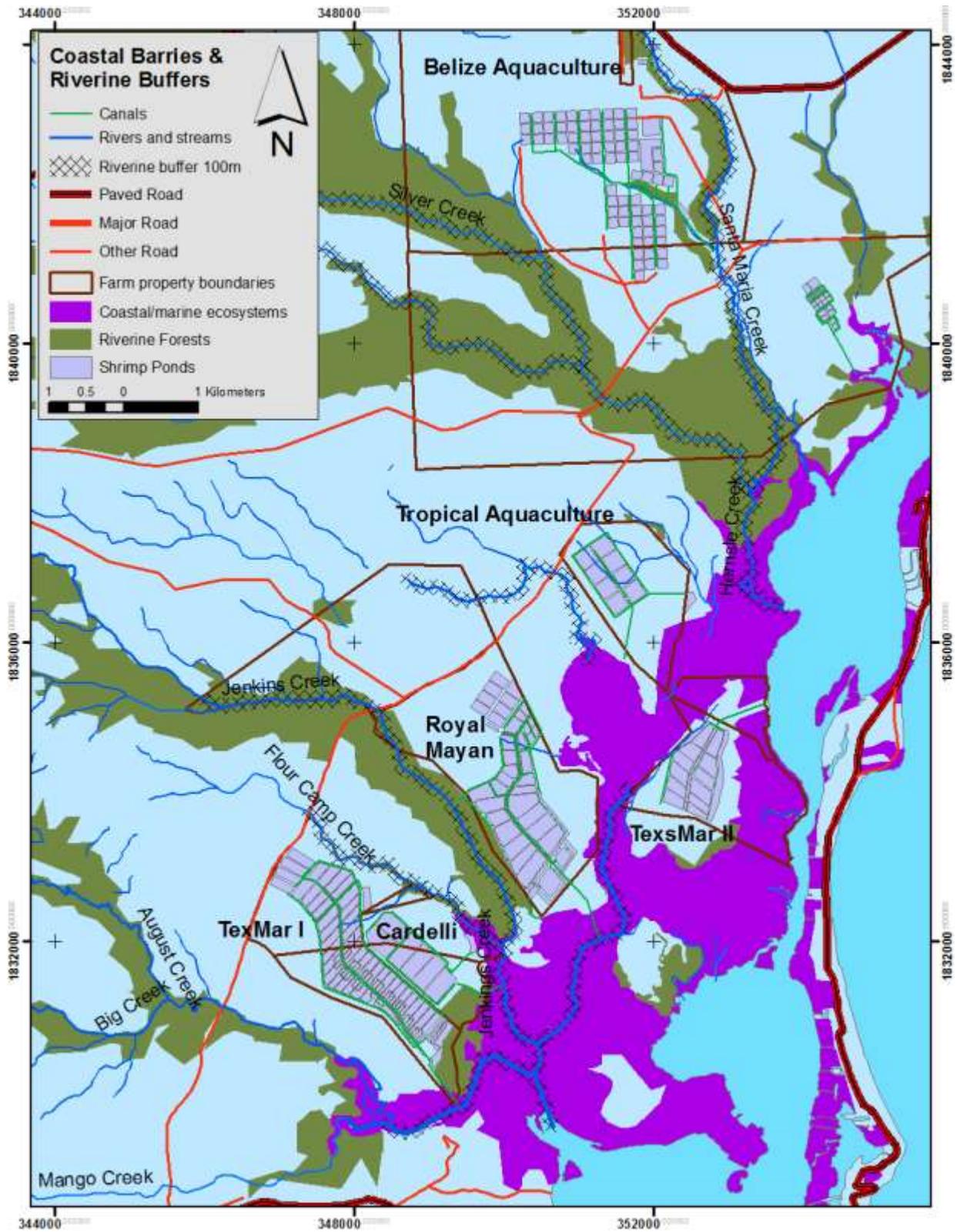
This follows ASC standards

2.4.1. *Coastal barriers: Minimum permanent barrier (or natural) between farm and marine environments*

2.4.2. *Riparian buffers: Minimum width of permanent native and natural vegetation between farms and natural aquatic/brackish environments*

2.4.3. *Corridors: Minimum width of permanent native and natural vegetation through farms to provide human or native wildlife movement across agricultural landscapes.*

These standards effectively deal with connectivity between adjacent ecosystems. Earlier it has been argued that as a habitat for endangered animal species, savannah is generally not considered a critical habitat as most species are wide ranging.



MAP 6. COASTAL BARRIERS AND RIVERINE BUFFERS IN THE TROPICAL AQUACULTURE INVESTMENT AREA

More important for wildlife is broad leaf forest. This is generally considered to be more species rich and offers better connectivity for secretive forest species. The broad leaf forest is represented in the Central Shrimp Farm corridors only at a few places and it is important not to consider stand-alone corridors for TAI but look at corridors from a landscape level. From this perspective, the riverine and marine mangrove ecosystems in the surrounding landscape (along Jenkins Creek and Silver Creek) are of great value and need to be safeguarded from any negative influences originating from the Tropical Aquaculture Investment development.

The coastal barriers in the case of TAI are mangrove wetlands that help in tidal wave control, sedimentation and nutrient trapping leading to increased water quality, which is important for the farm. From another stand point of view isolated patches of natural ecosystems may serve as stepping stones for the migration on species, especially small ones (many reptiles, birds, amphibians, insects and even mammals). These patches also provide critical resource such as food and even breeding habitat for species. It is not possible to assign a minimum width to these barriers. Essentially, all mangrove between the shrimp farms and the Placencia lagoon needs to be preserved.

6.5.1. Actions

- Safeguard remaining broad-leaf (along Jenkins Creek and Silver Creek) and mangrove landscape elements, even where outside the direct influence of the property
- Leave all riparian forests intact but at least maintain a minimum riparian buffer of 100 m on each side of the stream along the Jenkins Creek, Flour Camp Creeks, Silver Creek, Santa Maria Creek.
- Coastal Barries are essentially mangrove forest, whatever their width. All mangrove between the shrimp farms and the Placencia lagoon needs to be preserved.
- Corridors for the TAI property need to be considered at a landscape level and several shrimp farms need to “share” corridors.
- Where applicable reforest sides of outlet canals with mangrove.
- Monitoring of wildlife is expensive, time consuming and difficult to interpret. Instead it is recommended to take the survival of the wildlife corridors as a proxy for wildlife opportunities. The corridors need to be monitored on an annual basis using remote sensing (Appendix 13)

6.6. Salt Water Intrusion

This follows ASC standards:

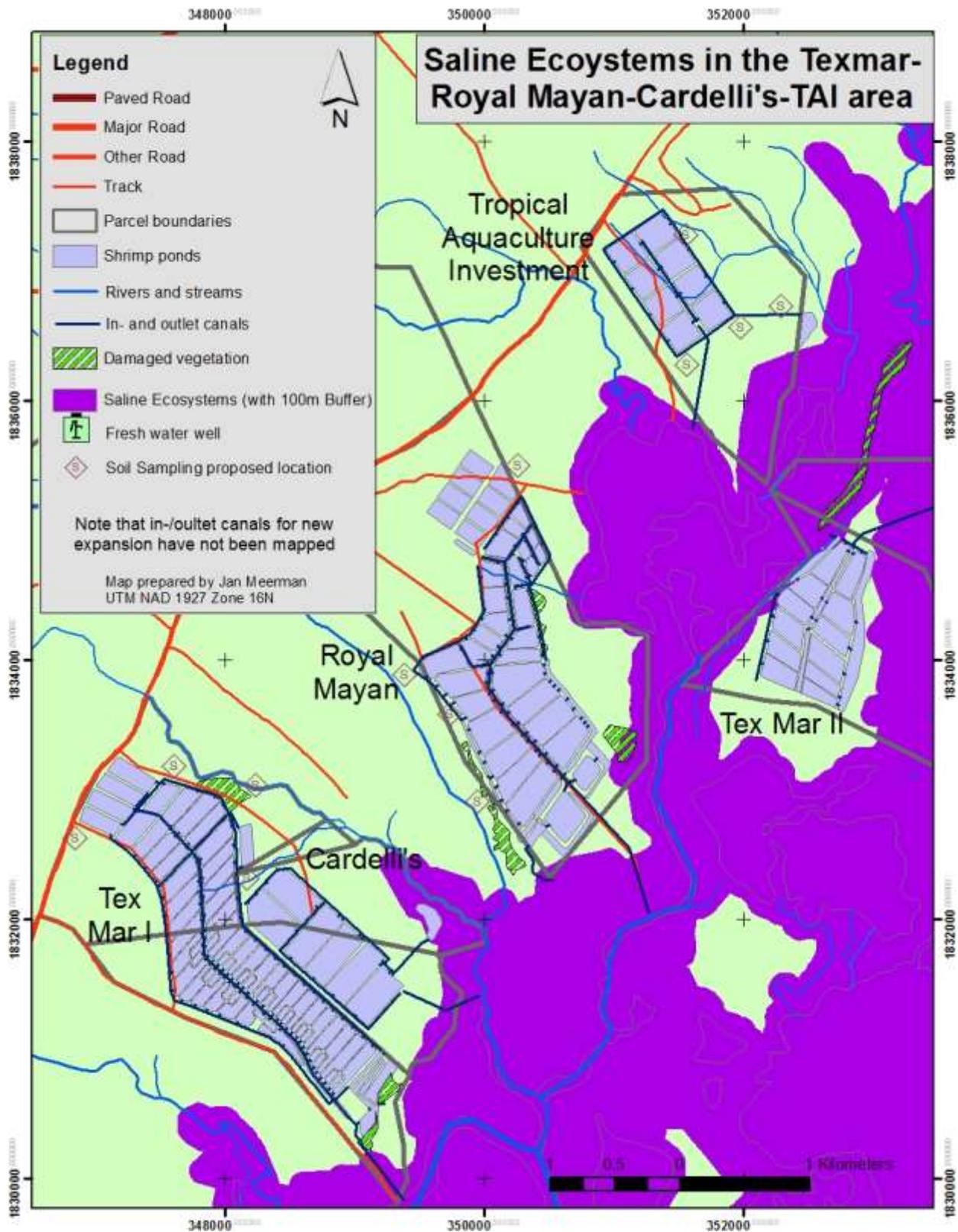
2.5.3. Water-specific conductance or chloride concentration in freshwater wells used by the farm or located on adjacent properties

2.5.4. Soil-specific conductance or chloride concentration in adjacent land ecosystems and agricultural fields

As can be seen from Map 7, the Tropical Aquaculture Investment ponds are essentially located on freshwater ecosystems but are bordered in the east by saline ecosystems.

The in- and outlet canals are probably the main conduits for seepage and salinization of the soils immediately next to the farms. On Map 7 can be seen that these canals do not add significantly to the incursion of salinity into the mainland.

Four soil sampling sites (to monitor for potential saline intrusion) are suggested in Map 7 and focus on areas of potential salt water seepage or intrusion.



MAP 7. SALT WATER AND SALINE ECOSYSTEMS AT TROPICAL AQUACULTURE INVESTMENT AND SURROUNDINGS



Fimbristylis cymosa



Sesuvium portulacastrum



Solanum donianum



Acrostychnum aureum

FIGURE 3. PLANT SPECIES THAT ARE INDICATIVE OF SALINITY OF THE SOIL.

6.6.1. Actions

- Establish a water monitoring protocol for fresh water well (s), focussing on potential saline intrusion
- Establish 4 soil monitoring sites.

6.7. Predator Control

This follows ASC standards:

5.2.1. Allowance for intentional lethal predator control of any protected, threatened or endangered species as defined by the International Union for Conservation of Nature (IUCN) Red List national listing processes, or other official lists

5.2.2. Allowance for use of lead shot and select chemicals for predator control

5.2.3. In case lethal predator control is used, a basic monitoring program must be in place for documenting the frequency of visits, variety of species and number of animals interacting with the farm.

The predation of cultured shrimp by birds can result in significant negative economic impacts to farmers by loss of stock. In some cases in Belize, farmers employ lethal control to deter or remove predators from their farms. The killing of predators can negatively impact predator populations and affect local biodiversity, especially when local predators (e.g., herons and egrets) become dependent on the reliable food source that shrimp farms provide. Although a consistent food supply is likely to enhance population numbers, it is also likely to change behaviour and local dispersal patterns of affected species that may ultimately affect the health of the predator populations. The ASC Shrimp Standard determined that the intentional killing or harassment of protected, threatened or endangered animals that prey on cultured shrimp is inappropriate for farms certified under this Standards. There, ASC Shrimp Standard is an allowance for limited lethal control of predators in exceptional situations, which must be appropriately documented by the farmer and made available for the auditor to a maximum of a yet undetermined number of occurrences per year.

Any lethal control must be exercised without the use of lead shots, as this has been found to have negative trophic and environmental impacts. Furthermore, farmers are not permitted to kill any species that are defined as protected, threatened or endangered by the IUCN Red List or state, local or national governments.

Belize does not have an official protected, threatened or endangered species list as defined by the International Union for Conservation of Nature (IUCN) Red List, but there an officious national listing processes has taken place during the 2005 National Protected Areas Policy and Systems Plan Formulation⁸. The list produced there is based on the then IUCN red list but takes into account national priorities. This species that are found on shrimp farms and occur on this list are listed in Appendix 9..

⁸ Meerman, J. C. 2005. Belize Protected Areas Policy and System Plan: RESULT 2: Protected Area System Assessment & Analysis, National List of Critical Species Report to the Protected Areas Systems Plan Office (PASPO) 8pp.

TABLE 6. NATIONAL LIST OF SPECIES OF CONSERVATION CONCERN THAT CAN BE FOUND ON SHRIMP FARMS.

The species generally considered to be the most damaging are shaded in Grey. Note that none of these species (apart from the Reddish Egret, which is probably very rare on shrimp farms which is listed as NT = Near threatened), none are actually IUCN listed as threatened or endangered.

Order	Species	English Name	IUCN class	Status in Belize	Justification
Birds	<i>Ajaia ajaja</i>	Roseate Spoonbill		VU	6
Birds	<i>Ardea herodias</i>	Great Blue Heron		VU	4,10
Birds	<i>Dendrocygna autumnalis</i>	Black-Bellied Whistling Duck		VU	4,10
Birds	<i>Egretta rufescens</i>	Reddish Egret	NT	VU	6,10
Birds	<i>Egretta thula</i>	Snowy Egret		VU	6,10
Birds	<i>Egretta tricolor</i>	Tricolored Heron		VU	6,10
Birds	<i>Eudocimus albus</i>	White Ibis		VU	6
Birds	<i>Fregata magnificens</i>	Magnificent Frigatebird		VU	6
Birds	<i>Jabiru mycteria</i>	Jabiru		VU	4,7,9,10, 11
Birds	<i>Mycteria americana</i>	Wood Stork		VU	4,6,10
Birds	<i>Nyctanassa violacea</i>	Yellow-Crowned Night-Heron		VU	6
Birds	<i>Nycticorax nycticorax</i>	Black-Crowned Night-Heron		VU	6
Birds	<i>Pelecanus occidentalis</i>	Brown Pelican		VU	6,10
Birds	<i>Phalacrocorax auritus</i>	Double-Crested Cormorant		VU	4,6,10
Birds	<i>Phalacrocorax brasilianus</i>	Neotropic Cormorant		VU	4,6,10
Birds	<i>Sterna antillarum</i>	Least Tern		VU	6
Birds	<i>Sterna sandvicensis</i>	Sandwich Tern		VU	6
Reptiles	<i>Crocodylus moreletii</i>	Morelet's Crocodile		CD	3,4,5,9,10

Justification:

1. The Fisheries Department expressed that it is aware of present trends in the global populations of all Groupers. Measures have been taken to protect spawning sites of these fish in Belize and the Department is attempting to introduce measures that will allow it to sustainably manage this resource. For this reason the grouper all have been placed in the CD = Conservation Dependant category.
2. Endemic species
3. Small Range – Regional Endemic
4. Hunted – Fished
5. Economic importance
6. Colony breeder (restricted number of breeding colonies/locations)
7. Needs large range
8. Specialized ecological requirements
9. Charismatic species drawing national and international attention
10. Prosecuted as perceived pest
11. Genetically different from South American counterpart

Farms must demonstrate that they have exhausted non-lethal options before lethal control is employed. Documentation must be provided to the auditor explaining the exceptional circumstances that led to the lethal control.

There appears to be little knowledge about the birds that prey on shrimp. Everyone mentions cormorants which are known as “shag”, as the most damaging. Since these are good divers and under water swimmers, they are perfectly suited to prey on bottom dwelling shrimp. Other species that have been mentioned as damaging to shrimp include terns (sometimes simply referred to as “sea-birds”). Their hunting method consists of diving into the water from a certain height and thus they may be capable of reaching the bottom of the shrimp ponds. They are however less proficient under water swimmers. Some farmers claim that herons (mostly Great Egret, Snowy Egret, Tricolored Heron and Little Blue Heron) are not an issue, other farmers consider them extremely damaging.

Some farmers strongly believe that bird and then specifically, predator abundance in farms to be an indication of farm management efficiency. They look at birds as indicators of pond health. Presence of shore line predators such as herons, indicate the presence of shrimp on the shoreline close to the surface and this is seen as an indicator of low dissolved oxygen or other stress factors. Abundance of shrimps at pond shore will undoubtedly attract predatory birds.

During 2014 fieldwork, it became obvious that some farms have greater number of birds (including predatory birds) than other farms. And this may reflect differences in pond management. Possibly, also, some farms are more rigorous in persecuting the birds, and as a result birds avoid such farms. But at this stage, there is no long term information available about the numbers and species present and which are subject to lethal control. A “book-keeping” or database of shot birds needs to be implemented. However, for this there is need for greater species knowledge amongst the farm staff. Nevertheless, such a database could over time provide important information on why some farms are more successful in deterring birds than others.

Appendix 12 presents the bird records obtained during fieldwork between June and September 2014.



FIGURE 4 LAUGHING GULL TRYING TO ROB A NEOTROPICAL CORMORANT OF ITS PREY (A SHRIMP?).



FIGURE 5. NEOTROPICAL CORMORANTS WITH ROYAL TERNS, CASPIAN TERNS AND LAUGHING GULLS.



FIGURE 6. NEOTROPICAL CORMORANTS AND GREAT EGRETS

6.7.1. Actions

- Develop a poster showing the potentially predatory birds (pictures) found within farms. The poster may also be useful to rank predatory birds based on damage they can do to shrimp farms so that farm personnel can differentiate them. Poster needs to indicate the local and scientific name of bird and indicate with arrows distinguishing characteristics for field identification of birds. Posters must be located at critical points (office, around ponds, security booths, ect.)
- Training of field personnel for bird identification, and specifically in distinguishing between predatory, harmless and even rare (Jabiru!) species.
- Create and implement a database tracking species controlled and killed. Specifying date, time number of individual, lethal method used and species involved.
- Analyse database on a yearly basis and extract patterns that indicate peaks in bird activity and effectiveness of control measures
- Use of steel/tungsten/bismuth or other non-lead shot to scare or kill birds. While it is difficult to get non-lead shot in Belize, the association can request the importer to get a special order.
- Use a combination of methods: setting of lines along the pond boundaries to prevent perching and walking of wading birds, deterring birds by chasing them frequently and allowing birds to perch, secure good water quality, shooting in the air and ultimately use lethal methods if all other methods do not work.

6.8. Introduction of non-native species

This follows ASC standard:

6.1.2. *Prevention measures in place to prevent escapes at harvest and during grow-out .*

Since the cultured species *Litopenaeus vannamei* is a non-native species, concerns have been expressed about shrimp escaping and establishing themselves in the wild of the Caribbean. Mechanisms to prevent escape that are proposed include:

- Effective screens or barriers of appropriate mesh size for the smallest animals present; double screened when non- indigenous species
- Perimeter pond banks or dykes are of adequate height and construction to prevent breaching in exceptional flood events.
- Regular, timely inspections are performed and recorded in a permanent register
- Timely repairs to the system are recorded
- Installation and management of trapping devices to sample for the existence of escapes; data is recorded
- Escape recovery protocols in place

6.8.1. Flood Risk as a result of hurricanes

Hurricanes potentially cause flood surges that could potentially flood the perimeter banks/dykes/berms of the shrimp farms and thus facilitate the escape of shrimp.

The perimeter banks and dykes of the Belizean farms are several meters high (lowest point the east side of TAI is 3.2 m [11 ft]) and during hurricane Richard (2011) similar dykes on other farms have proven high enough to prevent flooding and/or breaching (Forman pers. comm., Thornton pers.comm.).

Unfortunately, there exist no data on the maximum flood levels that can be experienced on the individual locations of the Belize coast. The Nation Emergency Management Authority (NEMO) has **no** records on file to this effect. The **only authoritative** report on flood levels is an OAS report from 1999.⁹ This report has been used in various flood risk assessments for Belize¹⁰

For the Placencia area, this report predicts various flood levels depending on the type of hurricane (Table 7).

⁹ OAS/USAID 1999. Storm hazard assessment for Belize : Storm surge and wind hazard maps OAS. Caribbean Disaster Mitigation Project.s.l, US; s.d

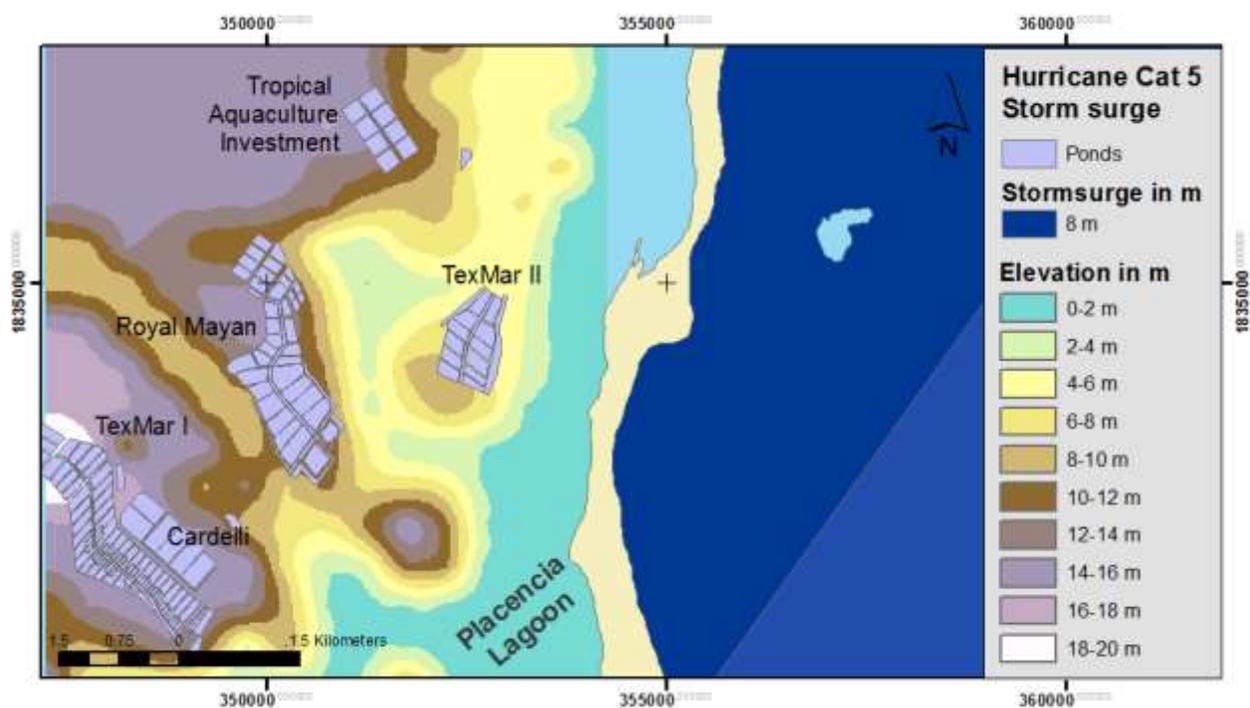
¹⁰ <http://documents.worldbank.org/curated/en/2014/07/19914285/belize-climate-resilient-infrastructure-project>

TABLE 7. SURGE HEIGHT NORTH OF PLACENCIA

Category	Surge height Placencia
1	1 m
2	2.5 m
3	3.5 m
4	4.5 m
5	8 m

As noted before, there are essentially no data on flood surge heights for Belize. For the more recent hurricanes we have estimates for two of them:

- Hurricane Hattie 1961 (Category 5) measured 4.3 m (14 ft) tidal surge in Belize City. The model indicated 8 m.
- Hurricane Iris 2001 (Category 4). Surge reports vary from 2.4 m (8 ft) to 4.6 m (15 ft) tidal surge at Placencia. The model indicated 4 m.
- Hurricane Richard 2010 (Category 1) tidal surge not reported but based on model should have been 1 m.

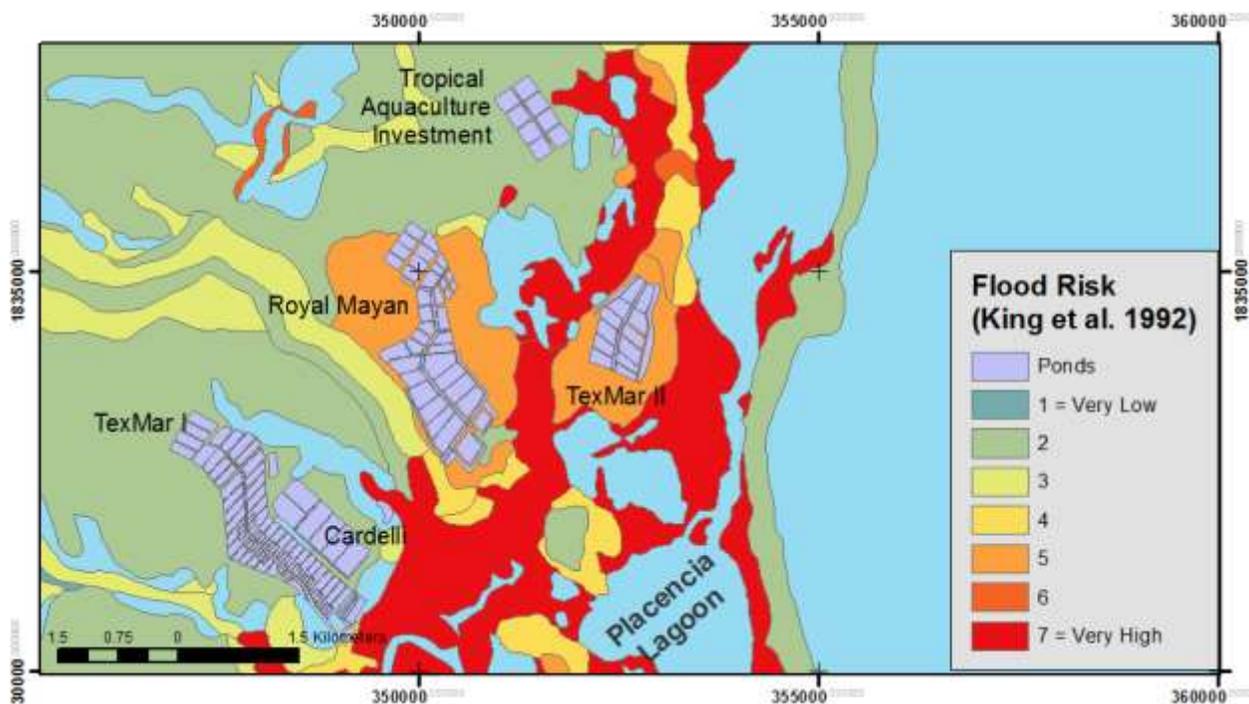


MAP 8. ELEVATION BASED ON A DIGITAL ELEVATION MODEL + EXPECTED FLOOD SURGE IN THE CASE OF A CATEGORY 5 HURRICANE. NOTE THAT THE MODEL DOES NOT IDENTIFY INLAND EXTEND OF A FLOOD SURGE.

Based on a 30 m resolution digital elevation model^{11 12} an elevation map was produced for the project area. Based on this, the TAI shrimp farm sits on land that is approximately 10 m above sea-level. With the lowest berm being 3.2 m. this brings the berm height well above the maximum predicted flood surge level. On top of that, TAI shrimp farm sits 3.8 km west of the Placencia peninsula shoreline and 1.6 km west of the Placencia Lagoon. The combined effect of distance, Peninsula + Lagoon + mangrove makes it very unlikely that even an 8 m flood surge even reaches the farm. Consequently, there is **no risk** of flooding as a result of a hurricane induced flood surge.

6.8.2. Regular flooding

A flood risk assessment¹³ based on rain based flooding puts TAI in a number 2 flood risk area, signifying very low flood risk. However, this flood risk was based on the original land cover which was lowland savanna. The current situation with raised berms etc., negates any flood risk from common rain events.



MAP 9. RAIN BASED FLOOD RISK (KING ET AL 1992)

¹¹ <http://asterweb.jpl.nasa.gov/gdem.asp>

¹² Digital elevation models can be deceiving as canopy height is captured, but these are the only national elevational data available for Belize at this point in time. In this case, tree cover "removed" by selecting the lowest cell value for 500x500 m blocks.

¹³ King, R. B., Baillie, I. C., Abell, T. M. B., Dunsmore, J. R., Gray, D. A., Pratt, J. H., Versey, H. R., Wright, A. C. S., Zisman, S. A. 1992. Land resource assessment of Northern Belize. Natural Resources Institute Bulletin 43, 2 volumes.

6.8.3. Escapes via waterways

All farms appear to have fine mesh screens in place on all outlets (see Figures 8 and 9). But from a practical point of view, these measures are more to prevent loss of shrimp than to prevent actual escape. The more important consideration is actually the risk of escaped shrimp spreading pathogens. The White shrimp *Litopenaeus vannamei* has already been detected in the Gulf of Mexico¹⁴ and possibly the Caribbean and efforts to prevent introduction into the wild may for all facts and purposes no longer be relevant. However, escape remains to be prevented for biosecurity purposes.

See appendix 8 for escape recovery plan.

6.8.4. Actions

- Continue with providing screening at all outlets. Provide double screening (one at pond outlet and one at end of discharge canal) where not already in place.
- Provide special measures (such as lowering water level) during a hurricane threat to prevent overflowing of ponds.
- All incidents of escapes will be properly documented on the appropriate pond record form and reported to the Fisheries and Agriculture Departments
- The retention pond will be sampled once per month to determine the level of the population of cultured species in it.
- Using appropriate methods, attempts will be made to harvest as much of the cultured species from the retention pond as possible.
- All sampling and harvest from the retention pond will be appropriately documented.
- Procedures will be reviewed and revised on a regular basis.

¹⁴ Wakida-Kusunoki, A.T., L.E. Amador-del Angel, P. Carrillo Alejandro & C. Quiroga Brahms. 2011. Presence of Pacific white shrimp *Litopenaeus vannamei* (Boone, 1931) in the Southern Gulf of Mexico. Aquatic Invasions (2011) Volume 6, Supplement 1: S139–S142



FIGURE 7. MESH TO PREVENT ESCAPE OF SHRIMP



FIGURE 8. MESH TO PREVENT THE ESCAPE OF SHRIMP

7 Identification of a Governmental Entity

In Belize, the Department of Rural Development is the governmental entity involved with the village authorities, the village councils. Each district has one or two Rural Community Development Officers; the Stann Creek officer has his office in Dangriga.

8 Identification of a civil society organization

During the first community meeting in Independence, the attendants proposed to have a copy of the draft and final p-SIA document lodged at the public library. The library was seen as an easy accessible entity where the public could have easily access to the document.

The participants of the Placencia Village meeting proposed the Non-Governmental Organization Southern Environmental Association (SEA), which runs an office in the village.

The Seine Bight attendants suggested the following organizations: the Seine Bight Women's Group or SEA.

9 Identification of the Tropical Aquaculture Investment Shrimp Farm stakeholders

Community: A group of people with possibly diverse characteristics who are linked by social ties, share common perspectives, and are joined by collective engagements within a geographically confined area. Four indicators:

- 1. A state of organized society in small form (town, village, hamlet) that recognizes a single representative (leader, formal or informal)*
- 2. The people inside a confined geographical area; small enough to allow face-to-face interaction as the main form of contact between the individuals within the group*
- 3. Having a common good or a common interest and recognizing that, and been recognized as having that.*
- 4. A sense of common identity and characteristics ('we' versus 'them' feeling) on either/or social, cultural, economic, ethnic grounds.*

Text Box 1: Description of communities (ASC, Principle 3)

Principle 3 focuses on the development and operating farms with consideration for surrounding communities, see Text Box 1 for a description what Principle 3 of the ASC considers a community.

In Table 8, an overview of the Tropical Aquaculture Investment stakeholders is presented. Based on this interpretation the following communities were regarded as stakeholders to the TAI shrimp farm and its operations:

TABLE 8. STAKEHOLDER GROUPS (WITHIN THE B-EIA/P-SIA CONTEXT)

Stakeholder group	Entities	Classification	Participated in the stakeholders process
Villages	Independence	Secondary /non-key stakeholder	Community meetings
	Placencia Village, Seine Bight	Secondary/non-key stakeholder	Community meetings
Neighbours	Private landowners	Primary/non-key stakeholders	Individual interviews
	Other shrimp farms	Primary/key stakeholder	Individual interviews
Sharing natural resources	Fishermen	Secondary/non-key stakeholders	Community meetings
	Belize Shrimp Growers Association	Primary, key Stakeholder	Member participation
NGO's	Southern Environmental Association (SEA)	Primary, key Stakeholder	Community meetings, individual interviews
	World Wildlife Fund	Primary, Key Stakeholder	Member participation
Governmental institutions	Department of Rural Development	Key stakeholder	Community meetings, individual interviews
	NIWRA	Key stakeholder	Individual interview
	Department of Environment	Key stakeholder	Individual interviews
	Social Investment Fund	Non-key stakeholder	Individual interview

Ways to classify stakeholder groups include:

- *Primary stakeholders: those affected, either positively or negatively, by a farm development or operation.*
- *Secondary stakeholders: those who are indirectly affected by a farm development or operation.*
- *Key stakeholders: (who can also belong to the first two groups) those who have significant influence upon or importance within or to the farm development operation.*
- *Non-key stakeholders: (who can also belong to the first two groups) those who are directly or indirectly affected and without significant influence or importance to the farm development or operation.*

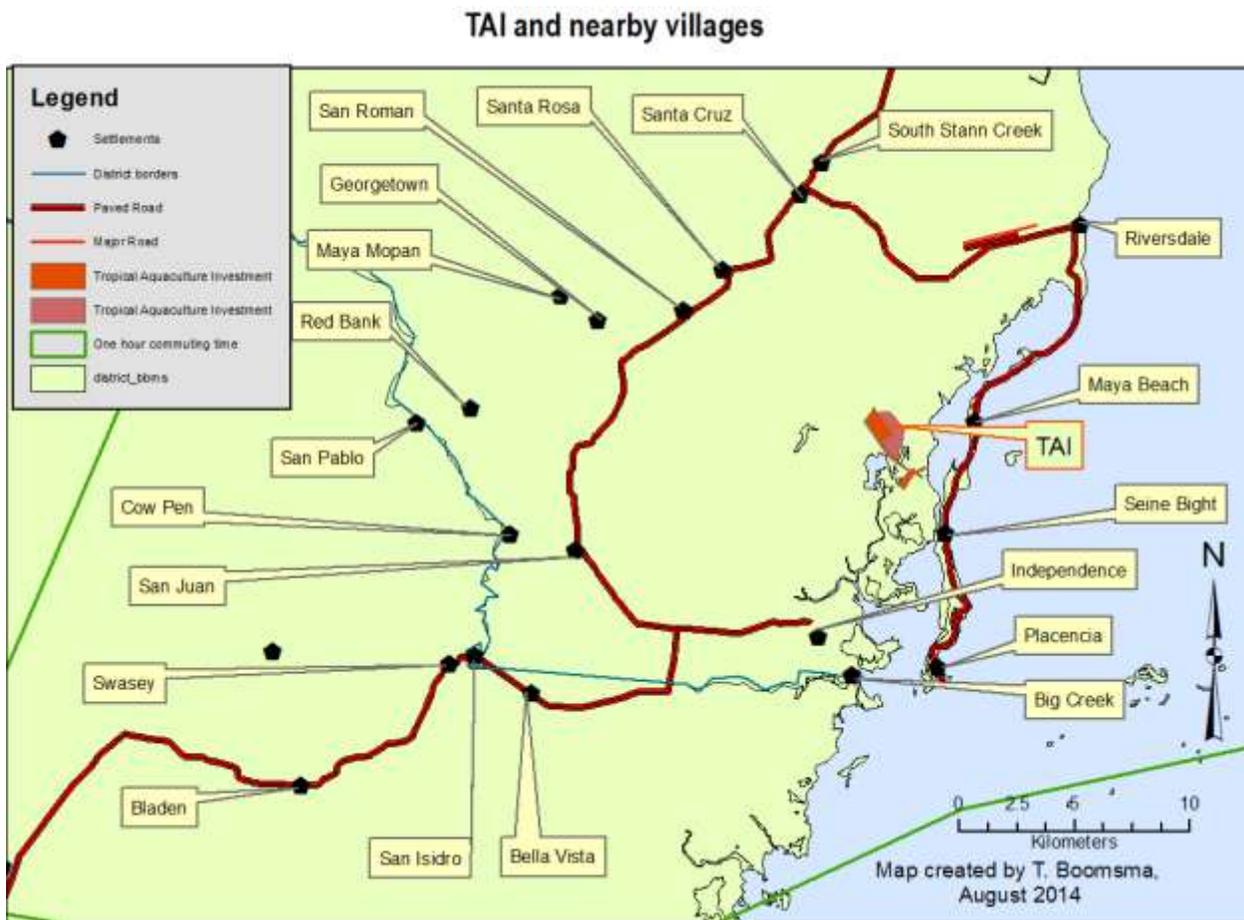
Text Box 2: Classification of stakeholders

9.1. Local communities: Independence, Placencia village and Seine Bight

Tropical Aquaculture Investment farm is rather remote; no through going road passes the farm. The nearest community to be reached by road is Independence. Other villages close by but separated from the farm by the Placencia lagoon are Placencia Village and Seine Bight.

Tropical Aquaculture Investment farm relates most with Independence, it is the centre of commerce and banking. Placencia and Seine Bight are as such not important to the farm; these two villages are too far from the farm to supply any source of labour. But the two villages claim that the presence of shrimp farms on the other side of the lagoon is affecting their livelihood and therefore Placencia and Seine Bight are included in the p-SIA.

The community meetings were conducted in order to learn from the residents the social and environmental concerns they had, most concerns were anecdotal and not documented. But it reveals that residents that may have concerns lack guidance to where and how they can find answers. There Overall, there were no acute outstanding issues relevant to Tropical Aquaculture Investment.



MAP 10. THE LOCATION OF VILLAGES NEAR TROPICAL AQUACULTURE INVESTMENT SHRIMP FARM

9.1.1. Independence

Independence (also known as Mango Creek) had 1,474 residents in 1980 (Census 1980) and counted 4,014 inhabitants in 2010 (Census 2010). The village is a commercial and service centre, with the main economic activity the deep water port of Big Creek where the export of crude oil and bananas are handled.

Independence is also closely connected to Placencia Village on the peninsula. Daily, hundreds of students cross the lagoon by ferry to attend the junior college and high school in Independence.

The relation of Independence with the shrimp farms is employment based; dozens of residents are permanently or occasionally employed by one of the six shrimp farms located north and south of the village. Although the village is originally a fishing village, only few fishermen explore the lagoon and the sea, catching fish for the local market; excessive catch is locally sold to a fish processing plant that prepares the fish for export.

Based on this relation with community, Independence was carefully chosen to be part of the community stakeholder process.

Overall, the attendants were of the opinion that the presence of shrimp farms near their community benefitted them more than it had adverse effects. Nevertheless, a number of concerns were raised that needs to be addressed.

Comments made by the attendants during the July 15, 2014 meeting in Independence with general responses added by consultant, based on feed-back from the shrimp farms:

- **Employment:** employment was seen as a positive contribution to the community. Although one of the attendants brought forward that most pay was low. No name of farm was mentioned, but this topic deserves following up (see principle 4 of the ASC standards).

Response:

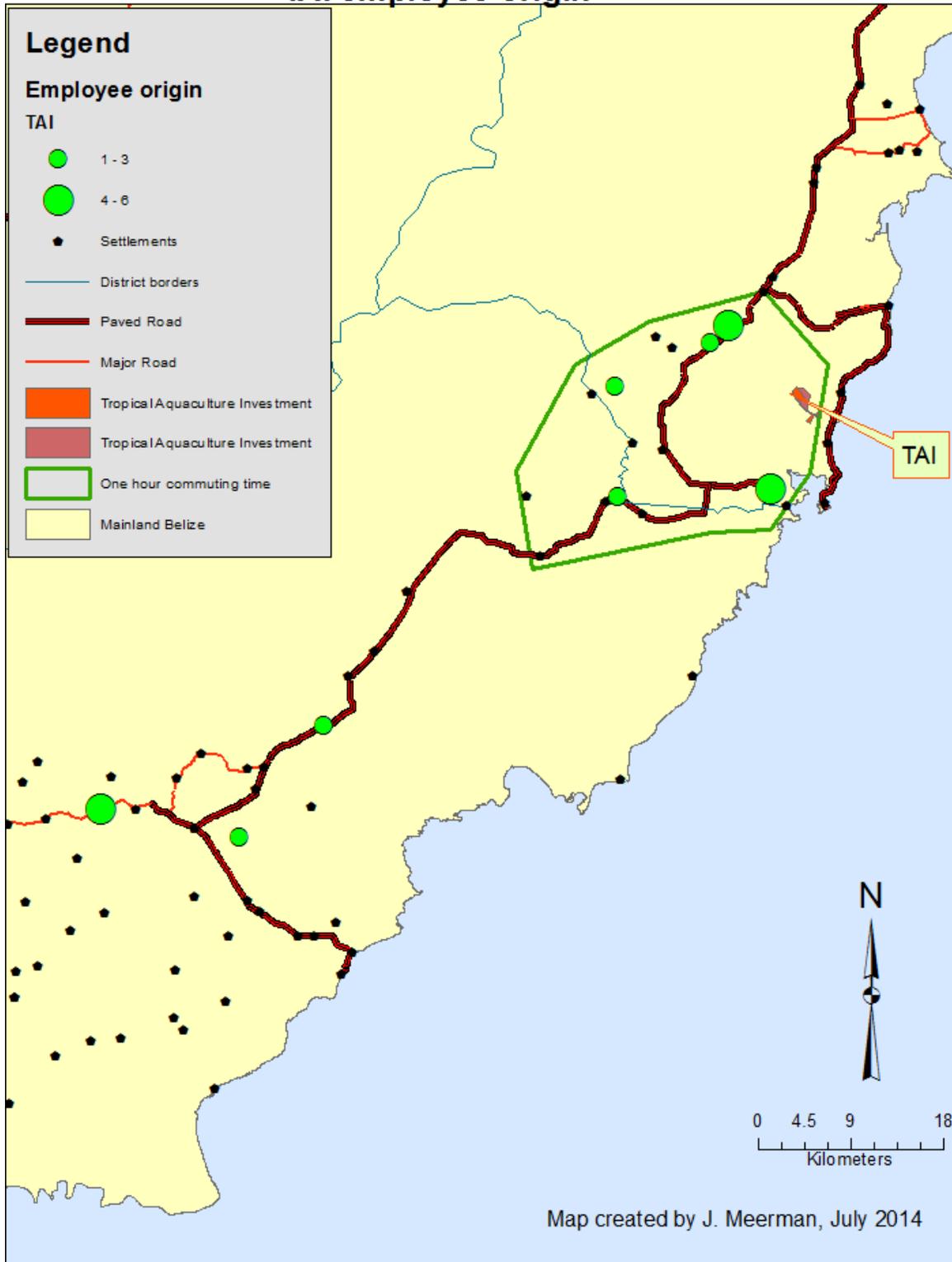
- **There may be confusion between persons permanently employed at the farms and people employed on a need basis by the shrimp processing plants. Processing plants are not subject to the ASC certification process but the general public does not separate activities of the shrimp farms from the processing plant if these are located on the same location as the farms. Further, labour disputes, for instance level of payment, should be addressed at the office of the Labour Department**
- **Expectations may be too high because of the opportunities for higher wages in the tourism industry just across the lagoon.**
- **Concerns about the effluent discharge:** algae bloom in the creeks prohibits the use of the water for swimming. Water is more turbid.

Response:

- **To enable the shrimp farms to address the matter of algae bloom or other signs of water pollution, this should be reported immediately to the farm whose outlet is closest to the point of water pollution. The complaint has to be documented with pictures, GPS location or sketch of the area, description of the pollution. Anecdotal stories of water pollution do not allow remedying the cause of pollution**
- **Changes in the biological environment:** fishermen notice changes in fish species they catch: decline in snappers and groupers, an increase in catfish. A researcher observed changes in sea grass species: an increase in a certain sea grass species that is known from deeper and/or turbid waters. Loss of mangrove: one person mentioned the loss of mangrove (on the mainland side of the lagoon), other persons mentioned that a former (now deserted) shrimp farm used to trim the mangrove and another attendant said that he had not seen changes in mangrove stands
Response:
 - **The B-EIA study compared the presence of mangrove in 1990 with the 2014 situation. Shrimp farms caused very little to none mangrove to be cleared. There are many large land parcels that are owned by other people or are still National Land. Any observation of mangrove clearing should be documented with pictures, mapping or GPS and reported to the shrimp farm closest to the location of clearing to verify if the farm was responsible for the clearing.**
- **Groundwater pollution:** question came up: do shrimp farms effect (pollute) the groundwater?
Response:
 - **Under the ASC standards, the shrimp farms have to monitor the level of water in their wells and the salinity of the water. If an increase in salinity is observed (apart from seasonal effects), the farm has to adjust their water management of the ponds.**
 - **The National Integrated Water Management Authority (NIWRA) has commissioned a study to determine the extent and carrying capacity of the Savannah Groundwater Province. This aquifer is used by the wells of Independence/Mango Creek to pump up water for Independence, Seine Bight and Placencia, the water comes from 300 feet deep. The well of the Santa Cruz Rural Water System is 114 feet deep. These wells are very unlikely impacted by the salt water of the shrimp ponds. The study has not been concluded, interested persons should contact NIWRA for more information.**
- **Visit to farms:** one attendant commented that they do not have access to shrimp farms to study changes in the environment
Response:
 - **Shrimp farms restrict access to their premises because of security reasons and bio-safety. The operations of the shrimp farms are monitored by the Department of Environment, the Department of Mining, and the auditor for the ACS certification. The ASC standards are very strict and encompass more than the Environmental Compliance Plan, issued by the DoE. Every year, the farm will be audited for the ASC, this audit is announced on the ASC website and concerned stakeholders can contact the auditor if they have any questions/concerns they feel were not properly addressed through the Conflict Resolution Policy Framework of the farm**

- **Complaints:** no one had to try to file a complaint with a farm because they had no complaints.
Response:
 - **All ASC certified farms have a Conflict Response Policy Framework. This policy is available at the website of the Belize Shrimp Growers Association (BSGA), hardcopies are deposited at village councils of nearby villages, Department of Rural Development, the Rural Community Development Officer in Dangriga, the Southern Environmental Association. Each farm has their contact information on the BSGA website and also at a sign at their gate(s).**

TAI employee origin



MAP 11. TAI FARM EMPLOYEES ORIGIN

9.1.2. Placencia Village and Seine Bight

Both villages are located on the Placencia Peninsula.

Placencia and Seine Bight are old fishing villages, population growth in the past was slow, partly because many residents moved away to find employment elsewhere.

TABLE 9. POPULATION GROWTH OF PLACENCIA AND SEINE BIGHT (SOURCE: SIB, BELIZE)

Year of Census	1980	1991	2000	2010
Placencia village	334	367	458	1,753
Seine Bight	465	504	831	1,310

During the last decennium, the economy of the two villages changed dramatically. The majority of the population earns their money in tourism and tourism related industries. What started as a small industry, catering for the backpackers, pretty soon turned into an industry that focuses more and more on the high end of the industry. A related development is the expansion of the condominium market, and the rental of complete houses. The tourism industry demands a large workforce, more than Placencia and Seine Bight could provide and as a result many workers originating from other parts of the country moved to the peninsula. In Table 9 the sharp increase in population of both villages is visible.

Only a handful of fishermen remained, they supply the local restaurants and hotels with daily fresh catch. During the tourism low season, the fishermen can sell their catch to an export oriented wholesaler who sells the cleaned and frozen fish to Jamaica.

Although the two villages are located on the other side of the lagoon, a large number of residents are concerned about the impact the shrimp farm operations may have on the water quality of the lagoon. For that reason, the two villages were included in the p-SIA process.

Comments made by attendants of the Placencia and Seine Bight meeting were related to

- **the quality of the water of the Placencia Lagoon:**
 - are there baseline data of the water of the lagoon
 - are the test results of the shrimp farm effluents available? Will they become available as part of the ASC certification process?
 - quality water lagoon should be tested by a third party to confirm the water testing done by the shrimp farms
 - do shrimp farms use any chemicals (pesticides, antibiotics for instance)
 - concerns about changes in fish species composition in the lagoon and the changes in the abundance of certain sea grass species. The attendants related the changes to the decreased water quality of the water in the lagoon
 - concerns about cutting/pruning and dying of the mangrove
 - there is also concern about the potential impact on the quality of the groundwater by the shrimp farms in general.

Response:

- **The Belize Water Services (BWSL) collected water samples in the lagoon as part of their water quality base line data. The Department of Environment takes water samples on a regular base. Also the shrimp farms have to take water samples to comply with their Environmental Compliance Plan. The outcome of these efforts have to be combined, and made available to interested BSGA could take the lead in this**
 - **Change in fish species: proper data has to be collected by the fishermen: daily catch (fish species, weight or length of the fish, where the fish was caught, date and weather conditions). No doubt the fishermen noticed changes in the fish population, but these changes should be properly documented. Even then it will be hard to pinpoint a specific cause for the noted decline**
 - **DoE plans to start an on-line filing system (PRTR: Pollutant Release Transfer Registry) whereby each development that has an effluent discharge license, will have to file the results of their mandatory water testing online. This system should be open to the general public**
 - **Although the extraction of ground water by TAI, is negligible compared with the surface area of the farm; the extraction could affect the farm itself because the groundwater level could lower, although the wells are far from the lagoon, potentially salt groundwater could replace the freshwater lens.**
 - **ASC will not make the effluent levels public, but the ASC standards require more comprehensive testing of the effluents than the ECP**
 - **For biosafety reasons, access to shrimp farms is limited. Since there are several parties working on water sampling, the goal should be to combine all data in a centralized database**
 - **The B-EIA concluded that very little mangrove was cut to establish the shrimp ponds**
- **employment.** This was brought forward in the Seine Bight meeting. Residents of this village feel they have little chance to becoming employed by a farm (they referred to the BAL shrimp farm since this farm is closest to the village) because of lack of farm transportation. Public buses are too expensive and bus schedules are not convenient for people commuting to and from shrimp farms. Attendants expressed the perception that Seine Bight villagers have a stigma and are therefore not selected for employment

Response:

- **Under a separate consultancy, a plan was developed to increase the efforts of the farms to employ persons of local communities.**
- **Disposal of shrimp heads:** is not properly done and is a nuisance to neighbouring communities (general comment, Placencia and Seine Bight do not experience problems with the stench)

Response:

- **If persons, communities, schools experience stench resulting from the disposal of shrimp, immediately a complaint should be filed with the farm from the where the stench comes. Response of the farm should be without delay to investigate the cause of the stench**
- **Contact with the farms.** Furthermore, the attendants mentioned that it is hard to contact the management of the farms and the public does not have access to the farms to carry out their own investigations
Response:
 - **Shrimp farms restrict access to their premises because of security reasons and bio-safety. The operations of the shrimp farms are monitored by the Department of Environment, the Department of Mining, and the auditor for the ACS certification. The ASC standards are very strict and encompass more than the Environmental Compliance Plan, issued by the DoE. Every year, the farm will be audited for the ASC, this audit is announced on the ASC website and concerned stakeholders can contact the auditor if they have any questions/concerns they feel were not properly addressed through the Conflict Resolution Policy Framework of the farm**
- **Availability of big shrimp.** Concern was expressed that it is impossible to buy big shrimps in Belize.
Response:
 - **The lack of reasonable freezer capacity makes it unprofitable for the farm owner to continue supplying big shrimp.**

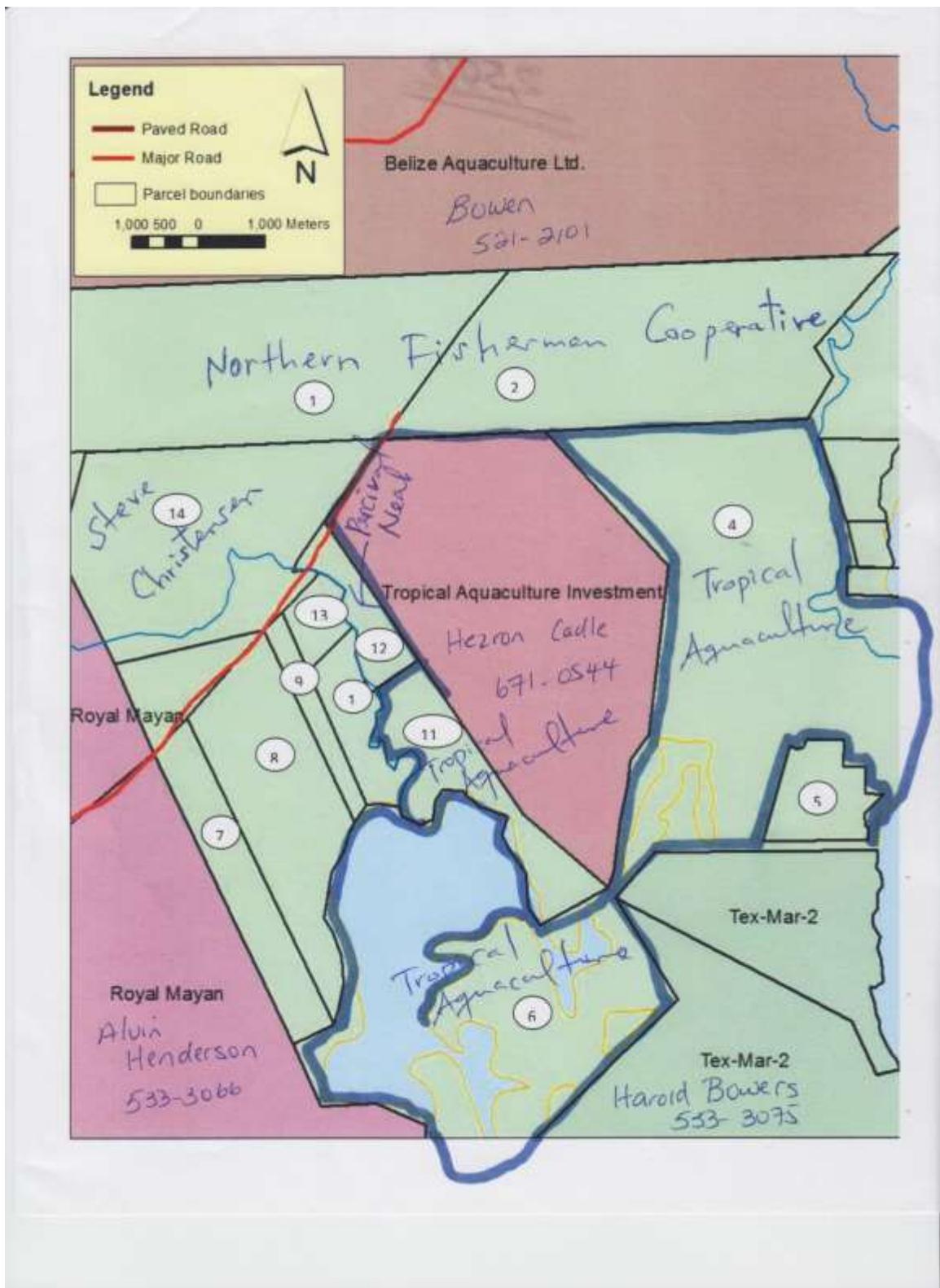
9.2. Neighbouring Land Owners

Tropical Aquaculture Investment is surrounded by several land parcels:

- in the north: Northern Fishermen Coop (Belize City)
- in the west: Steve Cristensen
- in the south: Percival Neal, Tropical Aquaculture Investment (not part of the present shrimp farm development)
- in the east: Tropical Aquaculture Investment (not part of the present shrimp farm development)

Percival and Jacqueline Neal: Interview was held with Ms. Jacqueline Neal.

The Neals owned their land before Tropical Aquaculture Investment started to develop the shrimp farm. The Neals were not informed about the plans of TAI. In the past, small conflicts arose but these were resolved. However, contact with the farm is via employees and not with the owner. Conflicts in the past were about dumping of shrimp heads on their property, killing livestock by the dogs owned by TAI, access to the Neals farm blocked by TAI, dying mangrove after flushing ponds. It is hard to contact the farm management.



MAP 12. TROPICAL AQUACULTURE INVESTMENT, WITH ADJACENT LAND OWNERS

9.3. Users of the same natural resources

Individual fishermen and representatives of the Fishermen Cooperatives were invited to join the community meetings. Their input in the discussion is included in the transcript of the meetings in Seine Bight and Placencia.

The Belize Shrimp Growers Association (BSGA) effectively falls in this category. The BSGA is the principal signatory body in the ASC certification process. The BSGA is listed in many of the actions and agreements in this document.

9.4. Non-Governmental Organization: Southern Environmental Association

Representatives of SEA were invited to participate in one of the community meetings. Comments were made in the Independence meeting concerning the change in abundance of sea grass species. SEA management were approached to comment on the draft Chapter 11: Deeper Research

9.5. Department of Rural Development

The Rural Community Development Officer of the Stann Creek district attended the community meeting in Santa Cruz. Additional, meetings were held with Mr. Ernest Banner (the Coordinator of the Department) and Mr. Hilberto Lopez, Water and Sanitation Coordinator of the Department, at the Ministry in Belmopan.

Comments made by Mr. Banner and Lopez:

- Shrimp farms have to take into consideration the quality of life of the surrounding communities
- Employment: what skills are needed for employment at shrimp farms? Communicate with local technical/vocational training institutions (for instance the Georgetown Technical High School) to discuss the possibility of offer suitable training to local communities.
- Increase visibility of the farms in the local communities
- Seepage of saline water into the soil/groundwater: what is the rate of seepage and how is it affecting the quality of groundwater?

See Appendix 5: Consultation with Ministry of Labour, Local Government, Rural Development, NEMO and Immigration. for the transcript of the meeting.

9.6. National Integrated Water Resources Authority

The head of NIWRA was approached to comment on the draft Chapter 11: Deeper Research to confirm that NIWRA is the right governmental agency to address the concerns about the quality of groundwater. Unfortunately, Mr. Flowers was not to be reached in his office for comments.

9.7. Department of Environment

Two meetings were held with the head of the monitoring department of DoE, Mr. Mai. It was confirmed that DoE is the governmental agency responsible for collecting test results of the effluent discharge by the farms. Mr. Mai recommends including monthly/bi-weekly sampling of the freshwater wells in order to detect changes in the salinity of the well water. See Appendix 4 for summary of the meetings

9.8. Social Investment Fund

Although a non-key stakeholder in the shrimp farm operations, SIF is in charge of the putting in place many public services: rudimentary water systems, school buildings, health clinics for example. A better understanding of national migration flows occurring and the mechanism that induced these flows, may benefit the planning of SIF's operations.

10 Deeper research needed on important impacts on the physical, biological and social environment

- **Cumulative effect of effluent discharge:** the discharge of effluent carries a potential risk of contamination of the receiving waters, which may affect the livelihood of local fishermen. Although the effluent discharge is subject to monitoring according to the Environmental Compliance Plan (ECP) that every operating shrimp farm has, results of the outcome of the monitoring are not readily accessible to the concerned public. The results that are filed with the DoE are not stored in electronic format. The Department of the Environment plans to change the method of filing by the shrimp farms (and any other enterprise that is required to do water quality monitoring), from hard copies into electronic copies by the end of 2014.

Response:

- **Extensive and semi-intensive shrimp farm technologies have lower levels of effluents than intensive and hyper intensive methods. TAI practices a semi-intensive technology.**
- **Now with the shift of many farmers to use automatic feeders this will help improve water quality as less food will be wasted, giving gave to increase nutrient levels in water which translates to increase algal blooms, this reducing DO in pond adding stress to shrimp**
- **ASC certified farms can only keep their certification if they comply with strict water quality monitoring programs which are very comprehensive.**

Action: dialogue with DoE to publish ALL monitoring data online. This action is best undertaken by the Belize Shrimp Growers Association (BSGA)

Action: Through the BSGA produce an integral map of all intake and discharge points for all farms.

Action: Supply information on the amount of effluent produced. This could go hand in hand with a record of how much water was abstracted (measuring pumping time with a known pump capacity). Effluent release could also be a simple calculation of the pond volume times the amount of times that it was drained + any partial releases.

Action: All effluent has to meet standards. In the case of "polishing" through vegetation such as mangrove, what counts would be the water quality at the point of release from the settling pond into the mangrove.

Action: As BSGA, in conjunction with DoE and BWSL, implement a water quality-monitoring program for the Placencia Lagoon.

- **Change of the biological environment:** change in the biological environment was often mentioned during the consultation process: cutting of mangrove, change in fish and sea-grass species composition in the Placencia Lagoon. Although the general perception was that the shrimp farms are responsible for these impacts, the coastal area is subject to many developments that may have impacted the biological environment.

Response:

- **the outcome of the B-EIA, that compared the presence of mangrove in 1996 and 2014, based on satellite imagery, concluded that mangrove destruction by shrimp farms was minimal to none**

Action: pursue the concept of protecting the remaining mangrove in a conservation zones or (private) protected areas, managed by the Southern Environmental Association (SEA) or a similar NGO. This could go hand in hand with the proposed declaration of the Placencia Lagoon as a National Protected Area.

- **Groundwater quantity and quality:** There is also concern about the potential impact on the quality of the groundwater by the shrimp farms. Most farms extract water from the ground water layer (some farms use surface water of creeks). Extensive water attraction can affect the freshwater layer and potentially salt water may replace it during the dry season. Even when shrimp farms do not apply any chemicals in their operations (pesticides, antibiotics, disinfection chemicals for instance), the original groundwater parameters may be changed by the presence of saltwater reservoirs (the ponds) above the groundwater. Saltwater could seep through the berms and the bottom, infiltrating the fresh groundwater. The way this may impact the environment:
 - the farm cannot use the water from their wells since it becomes brackish/saline
 - vegetation will die off because of the higher salinity of the groundwater, in one case it was observed that the dead vegetation was naturally replaced by mangrove seedlings,

but if this does not happen the nutrients of the waste water will not be absorbed and end up in the open sea. Also the coastline is less defended against erosion of wave action, in particular during the passing of tropical systems

Response:

- **The intake well at Mango Creek, that supplies the villages of Seine Bight, Placencia, Independence/Mango Creek with water is 300 feet deep. The well at Santa Cruz (Stann Creek) is 114 feet deep. Intrusion of salt water from the shrimp ponds is not likely affecting the aquifers of the village water systems.**

Action: well water monitoring (quantity and quality) is to be undertaken by the shrimp farms. Results should be combined to achieve an overall picture of the groundwater layer. At this moment, under the National Integrated Water Management Authority, a study is carried out to identify the extent and carrying capacity of the Savannah Groundwater Province (the Southern Coastal Savannah aquifer)

- **Hiring of employees outside reasonable commuting distance:** TAI hires some employees from remote areas. For certain positions employees from other parts of the country are preferred, to prevent any conflict of interest. Skilled staff may not be available within the nearby villages and recruiting from out of the district is needed.

Shrimp farming is not the only economic activity that depends on large numbers of employees, other sectors include the tourism industry, banana industry and to a lesser extent the orange groves. The last decennia, various new communities were established mainly along the southern highway, with a few others more in the foothills of the Maya Mountains. These settlements were foremost for the workers in the banana industry. Where no National Land was available for the new settlements, the Government had to acquire land for this purpose.

Some of the present residents originated from outside the Stann Creek districts in Belize, other came from neighbouring countries. As result, an unplanned demand for residential lots, social services arose that are still not fully met by the Government of Belize. A side effect is that since many persons from other districts left their villages where they often were involved in part- or full-time farming, their need for farm labour is met by numbers of labourers from neighbouring countries. This development is not well recognized in the country, or their potential consequences for the various rural areas involved.. This is an over-arching change, effecting many sectors of public life and the society and should be addressed by a multi-disciplinary taskforce of government entities.

Response:

- **The management of the ponds is a 24/7 activity, persons from nearby villages are less inclined to stay for night and weekend shifts. TAI strives to hire as many people from nearby villages as possible.**

Action: migration patterns within Belize, originating from changing national economies, have to be fully understood in order to understand the need for housing and social services. Actions should be pro-active instead of reactive. This effort could be spearheaded by the Department of

11 Proposed adaptations at farm set-up

11.1. Maximize positive impacts:

11.1.1. Employment:

- Justification for employment of each worker is available on file, based on profile or merits in case of a migrant worker
- Strictly apply labour law of Belize regarding minimum pay, overtime, holiday pay, labour conditions etc.
- Cooperate with the Labour Department office in Independence to advertise for vacancies.
- Develop a clear information sheet for job applicants to explain how long the information of the applicant will be filed, why an applicant was not hired etc.

11.1.2. Contributions to local communities, organizations, private persons:

- Develop a policy whereby TAI describes who will qualify for any in-kind or financial contributions (level to be determined by the company)

11.1.3. Website BSGA

- Use the BSGA website to share farm information, achievements, community support policy, employment application forms, job vacancies etc.

11.2. Minimize the negative impacts:

11.2.1. Water quality monitoring

- Strictly adhere to the water monitoring activities as formulated in the ECP (2001)
- Include the monitoring of the quality of the ground water (via the well) and the level of the groundwater in the well(s)
- Coordinate with the DoE to make the test results for the TAI available to the public if this is requested from DoE.
- Cooperate in the development of a comprehensive map of the water bodies, indicating points of water intake and water release

11.2.2. Develop a grievance procedure

- Developed a complaint form and a complaint register for complaints.

- Develop a community conflict resolution policy that guides the handling of complaints
- Make the complaint form available on the future BSGA website and at the gate of the farm. Include contact information available on TAI's page on the future BSGA website.
- Make farm management accessible to third parties: phone, website etc. Ensure that parties making inquiries or complaints are heard and answered

11.2.3. Future developments at the Tropical Aquaculture Investment farm:

- Any increase in production, either by increased acreage of the ponds or intensification of the shrimp rearing technology should only take place when TAI operates the present farm within the limits as agreed in the ECP

11.2.4. Website BSGA

- Develop a section 'frequently asked questions' (FAQ) that addresses most pertinent issues
- Use the BSGA website to share water quality monitoring results with the public, the complaints made and the resolving of these

12 Conflict Resolution Policy

The following text is Conflict Resolution Policy for local communities. Also See "Appendix 14. Complaint Resolution Policy Framework"

Conflict Resolution Policy: Local Community

Tropical Aquaculture Investment Ltd. is committed to supporting the surrounding local communities. TAI recognizes both the positive and negative impacts it can have locally and hopes that this policy can ensure that any areas of tension can be resolved in a timely manner. If any local community has a complaint against TAI, the company should be notified.

Procedure to file a complaint:

The complaint can be written in the form of a letter and mailed or delivered to TAI. TAI can also be notified of complaints through phone calls or emails. In the case of a phone call, the complainant should ask for the Human Resource Officer or the Accountant. The same principles apply for suggestions by local communities. All complaints will be reviewed and addressed within a 7days period.

Procedure to address complaints:

1. The Human Resource Officer at TAI will read and register the complaint/suggestion in the Complaint Register.
2. The complaint will then be forwarded to the Managing Director.
3. If the problem can be easily resolved a letter will be sent to the relevant party to notify them of the resolution for the problem.
4. If TAI cannot readily address the complaint the company will request a meeting to discuss the problem with the relevant parties. Minutes of the meeting will be placed on file.
5. Once a resolution is reached, both parties will sign an agreement over the terms of resolution.
6. If no agreement is reached a relevant 3rd party will be brought in to mediate a solution. This third party will be one of the Belizean government's Officers. This will again result in a written agreement.

13 Agree on impacts and measures to address them

Based on the outcomes of the community stakeholder presentation in Independence, Seine Bight and Placencia Villages in November, 2014 it was found that the responses and actions as presented in the meeting did not raise any questions. As Tropical Aquaculture Investment does not have a processing facility, its labor needs are much less than those farms that do processing.

14 Conclusions and agreements

TAI is the latest shrimp farm development; the first harvest was in 2013. Farm management will need time to control the specific rearing conditions, meanwhile implementing the ASC standards which are comprehensive and cover all aspects of a producing shrimp farm.

Farm management joined the efforts to become ASC certified which testifies of the intentions of the farm to fully adhere to the standards of ASC.

Conclusions:

- TAI now has a formal conflict resolution procedure provided through the project. The few complaints TAI received from its neighbours were resolved after the owners directly spoke with TAI staff.
- TAI does not maintain regular meetings with communities nor neighbours.
- During the stakeholder meetings, TAI was never mentioned in specifically as a shrimp farm that caused negative impacts to the social and biological environment. Complaints received during the meeting were generally non-specific; however one neighbour mentioned a few matters that were quickly resolved. A general complaint about shrimp farms was that they are hard to reach by phone.
- Although the shrimp farms were accused of causing mangrove loss, in reality, virtually no mangrove was cut by TAI, only for the digging of the intake channel a minimum areal of mangrove was needed.

Agreements:

- Post phone numbers and email addresses at public places, telephone directory, signs at their gate in order to facilitate the public who wishes to contact TAI
- As part of the ASC standards, TAI will organize meetings with the communities twice a year. Information about neighbours will be updated if needed; they will be engaged in stakeholder consultations through the community meetings or on an individual basis.
- TAI will use its website or the BSGA website to increase its visibility to the local communities: posting their civil society support actions, policies, conflict resolution framework, for instance.
- TAI will diligently monitor the salinity of the soil at the locations determined by the B-EIA consultant. Since TAI is a new farm, salinization from past activities will be low and the

monitoring could provide valuable information about seepage of saline water of shrimp ponds into the surrounding environment, if any.

- TAI will also monitor the discharge of wastewater; the effluent should be within the limits of the ASC and ECP.

15 Appendices

15.1. Appendix 1: Transcript first meeting consultant and management TAI

TABLE 10. TRANSCRIPT OF THE MEETING BETWEEN TROPICAL AQUACULTURE INVESTMENT MANAGEMENT AND CONSULTANT

Meeting TAI shrimp farm representatives and pSIA consultant Tineke Boomsma, 24 June 2014		
	Questions	<p>Tropical Aquaculture Investments (TAI)</p> <ul style="list-style-type: none"> • Hezron Cadle jr. • Lisa Linarez <p>Note: interview was held with a group of representatives of three farms: Cardelli Farms, Royal Mayan, Tropical Aquaculture Investments</p> <p>Comments received on July 4 and included in the transcript</p>
1	Introduction consultant	
2	Introduction principle 3, appendix II: are farmers familiar with these documents?	Lisa has read Principle 3 and Appendix II.
3	Existing line of communication with communities: <ol style="list-style-type: none"> a. village councils b. waterboards c. neighbouring landowners 	<ol style="list-style-type: none"> a. TAI has the info for Independence village council b. TAI (Lisa) says she knows staff and telephone number for Independence water board (Manager: Cristiana Pacquil and Clint Foreman is the chairperson 523-2238) TAI (Lisa) says she knows of this because of her personal relationship with members of the water board c. Our neighbouring landowners are Royal Mayan Shrimp Farms, Belize Aquaculture Limited and Texmar Ltd.
4	Do you maintain contact with stakeholders? Who initiates the contact?	Via Linda Thornton of Cardelli Farms, who is the representative of the shrimp farmers
5	Are there areas of conflict?	No
6	Do stakeholders, organizations complain about activities undertaken by the farm? If yes: how do you respond to their complaints? Do you document the interactions? How do you file the reports	No formal complaints
7	Do villagers use the property for hunting/fishing; do they request permission,; do you permit	No we do not allow villagers to use our property for fishing and hunting.

Meeting TAI shrimp farm representatives and pSIA consultant Tineke Boomsma, 24 June 2014

	that?	
8	If there is hunting, is that traditional activity or a recent phenomenon?	The location of the farms is a traditional hunting area.
9	What positive contributions your farm has made in the communities	TAI: Sports and recreational activities (Mundialito, football tournament for the youth and politicians). A budget is allocated to provide these funds.
10	Does your farm have a grievance procedure?	No
11	Who is monitoring the quality of the effluents? Time interval? Are the results deposited at DoE?	TAI: Lisa says they have someone that monitors the effluents (quarterly done), the results are sent to DOE. Lisa believes that they do have a license but was recently employed so vowed to verify if they do. We have applied to DOE for license and should receive sometime soon.
12	List of employees, their position and their village/town of origin?	TAI provided a hard copy. Kindly see attachment of employee listing..
13	How are new employees recruited?	TAI: employees are recruited from neighbouring communities. When they need someone it's basically word of mouth from an employee to a future employee. Supervisor finds employees, no need to advertise. TAI is working on creating an application form.
14	What percentage of employees originally originate from neighbouring villages (not the employees who moved to the village because they found employment at the farm?	TAI: employees are recruited from neighbouring communities. When they need someone it's basically word of mouth from an employee to a future employee. Supervisor finds employees no need to advertise. TAI is working on creating an application form.
15	Why are residents of the villages nearby, not hired?	Not applicable since residents of surrounding villages are hired
16	Do you offer lodging opportunities for employees who come from far (too far to commute on a daily basis)?	TAI: lodging is provided to workers on 10 day shifts and those that live out district
17	Do employees, who originally received lodging at the farm, ultimately settle in a nearby village?	None of them has moved
18	Do you do contract farming?	No

15.2. Appendix 2a: Transcript of meetings with Independence Village stakeholders

Independence: Community Meeting July 15, 2014

Venue: the SENter

Starting time: 5 pm, ended at 6.30 pm

1. a. Initially 5 persons present, increasing to 12 people. See attendants sheet for names and contact numbers. All attendants received a paper with general information about the ASC certification process, the ASC website, and contact information of pertinent governmental departments and the consultant.

1. b. Brief survey how attendants learned about the planned meeting (more than one option per person possible), based on the initial 5 attendants:

- Word of mouth: 3
- Pamphlets: 1
- Radio: none
- TV: 4

2. The consultant, Tineke Boomsma, introduced herself and her two assistants: Lesbia Cruz and Adrianna Vasquez

3. Shrimp farms that participate in the ASC certification preparation:

- Paradise: Coastal Road
- BAL
- Royal Mayan
- TexMar
- Cardelli
- TAI
- AquaMar
- BelEuro

She also gave a brief background of the locations and history of the eight shrimp farms.

4. Communities that are stakeholders, because of their close proximity to the participating farms:

- New Mullins River: because of proximity to Paradise.
- Riversdale: because of proximity to BAL
- Seine Bight: close proximity to the Placencia Lagoon
- Placencia: close proximity to the Placencia Lagoon
- Santa Cruz: b/c of proximity to BAL
- Independence: because of proximity to almost all shrimp farms (except Paradise)

5. ASC process:

- Aquaculture Stewardship Council. Tineke explained why the process is very important for the shrimp farms.
 - minimize the impact on the environment (including the communities) because of best farm practices
 - increased exports will increase the income of the government (GoB will have more money for roads, healthcare facilities, electrification projects etc.)
 - for the shrimp farm to make profit

Everybody will benefit from the certification

6. Difference between EIA /ECP and the ASC process

- ECP contract between DoE and development: specific for the development. In the past, the ECPs were very general but present day ECPs describe in detail the extent of the development and their operations. The ECPs also include the clause that the ECP can be up for reviewing, to include changes in the enterprise.

- ASC is not required by the GOB. The ASC certification is valid for three years (addition: the shrimp farm will be audited annually by the same auditor)

7/8. Went over the steps of the p-SIA process.

- Meeting with shrimp farms & surround communities: Tineke explained why it was important to have meetings with these two stakeholders so that in the future there is a platform for communication between the two stakeholders.
- Minutes of report will be sent to attendees of the meeting so that they can review it, submit corrections, additions etc. When persons do not comment, it is assumed they agree with the minutes.
- After that round: a draft report is presented to the shrimp farms, including the outcome of the stakeholder consultations.
- Draft and final reports are shared with village councils, local government (Rural Community Development Officer in the Stann Creek district and the Ministry of Rural Development), and a civil society organization.

9. Benefits and contributions to the local communities as seen by the attendants:

- Independence benefits: employment. But one attendant commented that employment factor is only marginally: the jobs are mostly low pay. It was mentioned that some workers earn only \$3/hour, which will amount to \$27 for a normal working day of 9 hours. To make more money you have to work overtime (1.5 x regular pay).
- One villager explains: *For the workers that are being paid by hourly rate at TAI, the hourly rate always exceeds the minimum hourly rate of the country. The hourly rate of these workers varies based on the type of work they do. Harvesters are casual workers and they only work when there is a harvest but they are also paid an hourly rate that is above the minimum hourly rate of the country (comment received by email on 25 July, 2014. Replaces original text)*
- Donations are made to help the village: in need always there for us. Independence Village would never talk negative about the shrimp farms because always here for us.
- Shrimp farms contribute to the economy of our country.
- Shrimp farms offer job opportunities to students during summer time: students earn money that helps them to pay for the coming academic year; and also the students gain job experience because of this. Shrimp farms (in general) also financially help the school.

10. Adverse effects of the presence and operations of the shrimp farms as seen by the attendants:

- Concern about proper effluent discharge. One attendant used to go swimming in the Mango Creek but would never do it now because of algae build up and loss of mangrove in the Creek. Other attendants responded that the mangrove most likely was trimmed and the lower mangrove was not result of declining health of the trees. Magnitude of Mangrove loss: 6 out of 10 with 10 the most severe impact.
- In Placencia lagoon: catch of fishermen: more catfish (in the past not common) and a decline in the catch of snappers, groupers. But is this related to the shrimp farms or other factors play a role?
- Other concern is water is more turbid: algae and other stuff. There are studies on the water quality but uncertain about studies on fish species. Some fish species are declining. One attendant recently carried out a survey of sea grass species in the lagoon. She noted that one certain sea grass species was present at all 30 sampling sites. This sea grass species is known from deep waters or places with higher turbidity (this species requires lower light intensities than other sea grass species). Since the Placencia Lagoon did not become deeper, the researcher concluded that the turbidity of the lagoon waters had increased. But what caused this? Is it from shrimp farm? Construction? Dredging? More research has to follow.

- Another attendant mentioned that he had been here for 60 years and have not seen changes in the mangrove. A former shrimp farm Crustacean (now closed) used to trim the mangrove, but since the closure the mangrove will grow back.
- Things will never be the same because development is needed.
- Concern about (open) water quality: DoE is monitoring it. This concern will be passed on to the consultant who carries out the biological assessment (principle 2).
- A concern that was related to the consultants by email was: is it possible that shrimp farms pollute the ground water?

12. The attendants do not think they would be better off if there were no shrimp farms.

13. Alternative use of the shrimp farm land was not a real option: there is no need for this land for residential development because the Belizean population is small and there is still plenty of land available.

14. Further notes:

- One villager has not seen any of the shrimp farm in operation.
- One attendant commented that they are not allowed to go to shrimp farms; all they can do is collect water samples and probably sent it to DoE after if they notice alarming changes
- Attendants have not complained because they have no complaints
- So far they are not aware of any complaints mainly because they don't have experience any problems

15. When the farms are harvesting they use workers from Independence. Community members that work at the shrimp farms advise students and others that are interested that jobs are available.

In Independence: community members express their interest to a specific field of job and this is sent to Labor Officer in Independence and when jobs are available, the people are contacted by the Labour Office.

16. The library (which is not an organization) and village council office were suggested as deposit for ASC communications.

17. Questions:

- a) At the end of consultation will there be an amalgamation of the data collected.
- b) Who do you report to after your p-SIA : *the p-SIA will be used by the participating shrimp farms during their auditing for ASC certification.*
- c) What is next after report is done? *Shrimp farms will request an audit whenever they have complied with all 7 principles.*
- d) In terms of transparency in regards to ASC , does the shrimp farm has to be transparent with the data obtained from the water quality testing done on the effluents (lagoon)? *This question is for the consultant for principle 2 (Jan Meerman), this question will be forwarded to him.*
- e) Does DOE visit the farm to monitor effluent discharge? DoE will take water samples during their field inspections. How often? *Variable between the farms.* Are the farms aware of the dates when they visit? *Farms are not informed on forehand when a DoE delegation will visit the farm.*
- f) The local communities have the negative and positive impacts of the shrimp farms. In some cases the positive effects prevail, in other situations the adverse impacts. In Independence the overall trend of the meeting showed that the positive effects predominated.

18. Reminder to the public: minutes of the meeting will be available through email.

19. During a second meeting the draft p-SIA report will be presented, and the public can comment on the draft.

End of the meeting at 6.30 pm

Village/Community	Independence / Mango Crk	Location:	Center in Independence
Date:	15 July, 2014	Starting Time:	
NAME	TELEPHONE NUMBER	EMAIL ADDRESS	ORGANIZATION
Ruth Gutierrez	671-8117	Ruth_Gutierrez94@yahoo.com	Intern at SEA-UB
Jessica Hamclam	670-2074	jessica@royalmaypushimp.com	Royal Mayan Southern Environmental Association
Aligail Garbutt	621 4666	agarbutt@seabelize.org	
Clifton Garbutt	636-3461	cliftongee@yahoo.com	Indep. High School college
WELLINGTON McCOON	671 8005	W.McCoon@hotmail.com	NONE
Tony Zabanich			
Tony Zabanich	Charmaine's	Tony.ZABANICH@A.Mail.Ro	
Ray Ogallier	670-0274	ray.ogallier@bigcreek.com	Bigcreek group of companies
Derrick Morgan	610-3975	bushman_czi@yahoo.com	None
Sergio Dorado	662-4084	sergio.dorado@bigcreek.com	Bigcreek group
Paula Bowers	533 3075	texmarltd@bt1.net	Texmar
Emilio ZABANEH	610-5412	EMILIOZAB@hotmail.com	Ind. Vil. Co.
Hilly Muschamp	533 3075	texmarltd@bt1.net	TexMar

FIGURE 9. LIST OF ATTENDANTS MEETING IN INDEPENDENCE ON 15 JULY 2014

Village	Independence
Shrimp Farms	Tropical Aquaculture Investment Ltd. (TAI), Royal Mayan Shrimp Farms Ltd. (Royal Mayan), Cardelli Farms Ltd. (Cardelli), Tex Mar Ltd. (Tex Mar), Aqua Mar Belize Ltd. (Aqua Mar), Bel-Euro Aquaculture Ltd. (Bel-Euro)
Date	4 November 2014
Venue	Senter
Time	2.30 – 3.30 pm
Attendants	17 persons , including the B-EIA and p-SIA consultants, the country WWF representative, and seven representatives of shrimp farms. See list attendants

Two weeks before the meeting hard copies of the draft B-EIA/p-SIA reports of the seven shrimp farms, including the conflict resolution policy, but exclusive of the appendices were delivered with the village council chairman. The complete document was available online. Villagers were informed about the upcoming meeting by means of flyers and posters, word of mouth, advertisements in Reporter and Amandala newspapers, text messages, email messages, and Facebook postings.

All attendants were issued an agenda for the meeting, a hardcopy of Chapter 9.1.1 of the draft B-EIA/p-SIA reports of the farms, reflecting the topics discussed on July 15, 2014 and the Conflict Resolution Policy.

Minutes of the meeting:

1. **Welcome** by the B-EIA consultant, Jan Meerman

2 and 3. First all attendants introduced themselves, most of them were representatives from the different shrimp farms: Aquamar, Royal Mayan and Tex Mar; Independence Junior College and village council members. The consultant briefly described the seven ASC principles for shrimp farming

4. Based on the outcome of the first community meeting (15 July 2014), the main concerns of Independence were discussed.

a. Cutting/dying of mangrove: The B-EIA reported concluded that very little mangrove was cut by shrimp farms, compared to the 1992 situation. Only small areas were cut to excavate the canal for water supply/discharge pond water. Some farms made an effort in re-planting mangrove, examples are BAL and Royal Mayan.

b. Whether the ground water quality can be impacted: to prevent contamination of the ground water: under the ASC principles and standards, the shrimp farms have to monitor salinization of the soil. Therefore they have to take samples of the soil to see if salinization is occurring. Also well water has to be tested on salinity.

c. Concerns about water quality of Placencia Lagoon: water quality is an important topic in the ASC certification. Shrimp farms are stepping up their monitoring and they will be audited on this subject. The water quality should improve because of this process

d. Employment opportunities: consultant explained that the Belize Shrimp Growers Association will establish 'Community Employment Desks' in villages adjacent of shrimp farms. The establishment of this

desk should improve the communication between village and shrimp farm in regard to employment opportunities.

The farm has an employee conflict resolution policy to address labour issues. Application forms are available at the gate. Concerning the level of wages: it was explained that all farms pay more than the minimum wage to their employees.

e. Contact with shrimp farm: Shrimp farms can be hard to contact: direct access to the farms is limited because of bio-security considerations. Attendants were explained that several measures will come into effect that can improve the communication between village and farm: community meetings twice a year, the establishment of a community employment desk, conflict resolution policy.

g. Presentation of the conflict resolution policy: all attendants received a hard copy of this policy. The consultant mentioned that the full conflict resolution policy and framework will be included in the final document which will be lodged with the village council and the SEA office in Placencia. This topic did not raise any questions

h. Although the stench of discarded shrimp waste is not experienced in Independence village, this topic came up several times during meetings with stakeholders. A solid waste management plan is developed for every farm, and this plan will also cover the discarding of shrimp waste. Investigation takes place to finding out if this waste can be used as a resource.

i. The audit process

The consultant went over the audit process. The shrimp farms will be audited by an external accredited auditor according to the 7 ASC principles. To ensure that the shrimp farms are complying everything will be audited. The audit process will be announced 30 days ahead on an ASC website which allows stakeholders to contact the auditor ahead of time and express concerns. He made it known that the draft audit report will be online for 10 days after it has been done so that stakeholders are able to view it. Consultant presented a set of useful links to the members of the meeting.

6. Discussion

Question came up about the complaint resolution policy: There are two policies, one for employee-management concerns and the other for stakeholders-farm issues.

The importance of the community complaint resolution policy framework was emphasized: The annual audit will check on the status of complaints, if there are any outstanding issues.

Consultant explained that the information that came forward from this meeting will be included in the final report, hard copies of the reports will be deposited with the village council chairman and the office of SEA in Placencia.

7. Conclusions:

The village council chairman of Independence confirmed that the draft report gave a good representation of the issues that came forward during the first community meeting in July 2014, he was pleased with the report and thanked the consultants for presenting the report..

8. Adjournment:

the meeting was adjourned at 3.30 pm

1 of 2

Presentation of the DRAFT B-EIA and p-SIA report for the shrimp farms (BAL, TAI, TEX MAR, Royal Mayan, Cardelli, Bel-Euro and Aquamar) in Independence, including the community complaint resolution policy			
Village/Community	Independence	Location:	The Senter
Date:	4 November 2014	Starting Time:	2 pm
NAME	TELEPHONE NUMBER	EMAIL ADDRESS	ORGANIZATION
Jessica Ramclan	670-2074	jessica@royalmayanshrimp.com	Royal Mayan Shrimp Farm
Marie Longworth	671-3114	marie@royalmayanshrimp.com	Royal Mayan Shrimp Farm
Danita Morey	624-1264	Danita.Morey@pfa.com M. Dunche	Aqua Mar shrimp farm i.e.t.
Mauricio Mesia	610-4858	mmesia@wofca.org	WOLF
Kendie Kluscamp	633-2305	Kendie.Kluscamp@gmail.com	TexMar Ltd
Arnaldo Vasquez			TexMar
Anthony Chaplin	622-0167	Texmar@tdl.net	TexMar
Jan Meerzema	834-4017	meerzema@bhp.net	Consultant
Tony ZABANEN	523-2011	Tony.ZABANEN@HAWAII.V.I.C.	
Clifton Gumbutt	636-3461	cliftongee@yahoo.com	Independence Junior College
Tineke Boomsma	834-4014	tineke.greenhills@gmail.com	p-SIA Consultant
Adrian Vasquez	635-5845	adrian.vasquez@gmail.com	Citizen of the Pacific Area

Presentation of the DRAFT B-EIA and p-SIA report for the shrimp farms (BAL, TAI, TEX MAR, Royal Mayan, Cardelli, Bel-Euro and Aquamar) in Independence, including the community complaint resolution policy			
Village/Community	Independence	Location:	The Senter
Date:	4 November 2014	Starting Time:	2 pm
NAME	TELEPHONE NUMBER	EMAIL ADDRESS	ORGANIZATION
Dennis Hurdie	631-6334	dennis.hurdie@hotmail.com	DSC Consulting
Samuel ZABANEN	622-2112	Samuel.ZABANEN@HAWAII.V.I.C.	V.I.C.
NATHAN YOUNG	622-1644	nyoung_texas@yahoo.com	V.I.C.
Godfrey Arce	636-3273	godfrey_arce@yahoo.com	V.I.C.

15.3. Appendix 2b: Transcript meetings with Placencia Village stakeholders

Placencia Village Community Meeting July 21, 2014

Venue: Community Center

Starting time: 5.45 pm, ended at 7.45 pm

1. Ms. Tineke welcomed everyone and asked if everyone has signed the attendance sheet.
 - a. A total of 13 persons attended part or the whole meeting. All attendants received a paper with general information about the ASC certification process, the ASC website, and contact information of pertinent governmental departments and the consultant
 - b. Brief survey how attendants learned about the planned meeting (more than one option per person possible), based on the response of 13 attendants:
 - Word of mouth: 6
 - Pamphlets: 3
 - Radio: 4
 - TV: none
2. She introduced herself as the consultant as well as her two assistants Lesbia Cruz, and Adrianna Vasquez.
3. She spoke about the 8 shrimp farms that are participating in becoming certified from the Aquaculture Stewardship Council (ASC).
 - Paradise along the Coastal Road
 - BAL
 - Royal Mayan
 - TexMar
 - Cardelli
 - TAI
 - AquaMar
 - BelEuro
4. She mentioned the different communities that are involved in the P-SIA. She mentioned that Riversdale will be combined with Seine Bight. The reason for having Seine Bight and Placencia included in the stakeholders consultation is because they may experience actual or potential impacts from the presence and operations of the shrimp farms.
5. ASC is a consumer label. For example there are similar consumer labels for coffee production and lumber production. These 8 shrimp farms are doing the same for shrimps. By having this label the consumer is informed about the way the product is produced, the educated public may prefer certified products, and thus increase the market share of these farms. She went over some names that the public may see in the newspapers or on TV: Mauricio Mejia of the WWF; the WWF is supporting this initiative that ultimately helps the farms to develop better farm practices.

6. ASC certificate is valid for three years; every year the farm gets audited, by the same auditor. Every audit the farms have to show progress in the criteria that were not done or not compliant with the standards during the initial audit. Of course the farm has to keep up the level of performance for all criteria it did pass. The same auditor is sent because of his/her familiarity with the farm. Environmental Compliance Plans (ECP) were very general but recently, ECP's have become more detailed. ECPs can be reviewed after a number of years.

To operate a shrimp farm, the management of the farm has to have signed an Environmental Compliance Plan. The water quality test results have to be submitted to the Department of Environment on a quarterly base, but conditions about the timing of the sampling are not (or not always) included in the ECP

7. The P-SIA.

- She explained the public that the minutes of the meeting are being taken and will be forward to the attendees of the meeting. When they receive it they are able to review it, make changes if necessary, and send it back to Ms. Tineke who will adapt the minutes if needed.
- She asks the public that if they can notify other members of the community about the effort of attending the meetings because the number of persons attending this evening is small
- She explained that she had met with the representatives from shrimp farms; this meeting is just for the public to voice their concerns without feeling intimidated.
- She went over the steps that she will have meetings with other stakeholders: landowners, NGOs, governmental departments etc.
- She explains that this opportunity is given so that people can make their concerns known because maybe they don't have direct access to the offices of the shrimp farms. The feedback of the shrimp farms will be included in the report; this draft report will be presented to the communities involved in the stakeholders' process.
- When a shrimp farms applies for the audit, this will be announced on the ASC website. The stakeholders will have 30 days prior of the farm visit by the auditor(s), the opportunity to contact the auditor to express their concerns if they have any. After the audit, the draft audit report becomes available on the ASC website, there is a 14 day time period the stakeholders can comment it. <http://www.asc-aqua.org/index.cfm?act=tekst.item&iid=4&iids=258&lng=1#ngnocsebidns>

8. Transparency of the process.

- She explains that the minutes and the draft reports can be emailed to the members of the community. She also mentioned to the public that if there are others that are interested in the meeting but weren't able to make it she can also send a copy of the minutes so that they are informed.
- She mentioned that the village council, the Rural Community Development Officer in Dangriga and a civil society organization will receive a copy of the draft and final reports.

- See also under point 7

9. Does Placencia enjoy the benefits of the presence of the shrimp farms?

- Restaurant benefits from the availability of locally produced shrimps but it is hard to get the bigger shrimps because most of it is exported.

10. Concerns:

- TAI used to provide big shrimps to Placencia but not anymore because the farm does not have access to refrigeration. Resident also mentioned that it would be nice if the shrimp farms can reserve some of the big shrimps for Placencia.
- Concern is that we find the 'rejects' at the supermarket it would be nice to find premium (which according to many is synonym with big shrimps) in the supermarkets or restaurants
- Resident mentioned that TexMar market is for smaller shrimps; also mentioned that a while back there was a 'regulation' (or policy?) that a certain percentage of shrimps were supposed to stay in the country for the local market. Made mentioned of how expensive it is to buy the Jumbo shrimps (in PG).
- Resident also mentioned about the market: E.g. if they are targeting for 32, the shrimp farm will produce 32 (32 shrimps per pound, the smaller size shrimp)
- Question was brought up about the effluent discharge: will this change due to the ASC. Is there anybody that checks the quality of the effluent water at the moment?
- Is it true that there are higher levels of nutrients at the area where the effluents are discharged than what was baseline?
- It is a great concern overall about the health of the lagoon: you have banana industry that sprays, the shrimp farms that releases effluents. (Concern came about because of a past event whereby population of fishes died but the person who mentioned this was uncertain what caused it)
- Is the effluent being monitored? Can this info be sent to the public? How do we know that the process of taking the sampling isn't tainted but is transparent? Validity of the results. Ms. Tineke responded that the DOE does go in and take samples; DoE officers come at random and do take their own samples. It is unknown what the outcome of the sampling is, and if these results are available to the public. (Note: Mr. Anthony Mai of DoE explained that the test results of the water sampling are public, they are available at the DoE office).
- Are there regulations in place to ensure no tweaking is done in the process of monitoring effluent discharge for ASC certification?
- Resident was concerned that there is no baseline for the South Stann Creek River as well as the lagoon available but only to Maritime Waters. Another resident made it known that there is baseline data from the past in regards to the lagoon (but availability is not known)
- IF the ASC is requiring them to have this effluent discharge monitoring done, will the shrimp farms make it public?

- Mangroves where the effluents are discharged are greener than those that are further away; is this because of the nutrients? Or is it caused by the natural sediment load of the creek?
- Resident made his concern about the coral, and sea grass along the coast are dying. The stench of poison is noticed in the lagoon. His concern is that the lagoons are tainted and not crystal clear because the creeks streaming down are polluted and thus pollutes the rest of the lagoon and then the sea.
- Have the attendants asked the shrimp farms about their concerns? There is a lack of communication. Farms have big dogs, big gates. A residents who operates a farm at Flour Camp (on the other side of the Lagoon), built a bridge is on their property to cross the Flour Camp Creek, but this access was closed by TAI management. The bridge was re-opened after owners complained to Mr. Cadle about the closing. But it was hard to contact the management and discuss the matter.
- Uncertain if the chemicals (the shrimp farms use) are being monitored. Corals and Mangroves are dying. The fishermen have been witnessing this. It can be seen that Mangroves are disappearing on property near TAI. Slime is seen on the rocks (coral) and mangroves.
- A general concern is that the waterways are not being tested throughout the country on the presence of Fecal Coliform. Is there Fecal Coli in the wastewater from the farms?
- The coast and lagoon are not being viewed as a system. Since the coast isn't being monitored, we don't have the baseline data collected on a daily basis by the government, we do not know what the impact of the shrimp industry is.
- Concern is that it is known that any ordinary citizen can't go in the shrimp farms to do these water quality tests; but is the responsible department doing it?
- Citizen is concerned that there is too much talking and the fishermen of the village get fed up because nothing is done and their environment is only being destroyed.
- Ms. Tineke mentioned that the shrimp farms are also concerned about the water quality because the shrimp farms take in water from the lagoon for their operations so they need clean water as well.
- Another concern is that the residents of Placencia Village would want to have an independent company testing the water quality when the shrimp farms do their test as well.
- There is NO communication with the farms; they are NOT willing to talk to the public.
- Ms. Tineke mentioned that she is here to prepare the shrimp farms to pass the audit and to make the public part of the process. Shrimp farms have to establish a participatory Social Impact Assessment, this is one of the requirements to comply with the ASC standards
- Shrimp farms and BWS: conflict over location of new BWS sewage project. The shrimp farms opposing the proposed location of the treatment ponds but this may stop this sewerage project from occurring and a resident believe this can be seen as a social impact.

11. Minimize the adverse effects:

- Get an overall analysis of all developments around the Placencia Lagoon and not putting the blame on one area of development.

- Make test results of the water quality monitoring public so the community can have a better understanding of the actual/potential impact of the shrimp farms
- Increase the level of fines for not complying with the legislation in Belize
- Manage the farm properly

12. Would the village would be better off without no shrimp farm

- No. Because of the jobs they provide but they should be managed properly.

13. Shrimp farms are good but just need proper management and do what is required of them to keep the waste from being detrimental to the environment. Why is this not happening to minimize the effects?

14. The terrain where the shrimp farms are marginally suitable for other land uses such as farming.

15. No, there are not people in Placencia that wants to work at the shrimp farms. Wages are too low and they treat the people inhumanely. Also transportation of workers from the peninsula to the farms is a problem. People only work there if they NEED to.

16. The Village Council and SEA would be the best places to have hard copies of the report available

17. Any more questions?

- Even if shrimp farms are not participating in the ASC the government should put more strict regulations for the shrimp farms to follow. Ms. Tineke mentioned that there is legislation that addresses certain topics: the Labour Act, the effluent discharge regulations, and the mangroves (in regards to cutting) permit. Concern is also made about the fine being less about what the cost to apply for the permit. Penalty should be harsher.

18. Ms. Tineke mentioned that the minutes of the meeting will be available to them and also ensured that they leave email address and mobile number. Ms. Tineke told them to feel free to send her any more comments that they may want to have.

19. The draft p-SIA report will be made available to the stakeholders; during a second community meeting the public will be asked for their comments.

End of the meeting at 7.45 pm

FIGURE 10. ATTENDANTS OF THE FIRST COMMUNITY MEETING IN PLACENCIA, 21 JULY 2014

Village/Community		Location:	
Placencia Village		Community Center at Placencia	
Date:		Starting Time:	
21 July, 2014		5:00pm	
NAME	TELEPHONE NUMBER	EMAIL ADDRESS	ORGANIZATION
Mary Toy	523-5018	mary@destinations belize.com	PCSD
Nick Pollard	631-7790	nickp1982@hotmail.com	PVC/PTGA
Gilbert Gonzalez	669-8745		PTGA
Jacqueline Neal	523-3131/604528		Village Properties
Priscilla Neal	631-7665	PNeal27@yahoo.com	BUSINESSMAN
Oscar Alonzo	600-3903	oscar.alonzo@bws1.com.bz	BWS
BEVERLY Mohammedi	600-2899	beverly.mohammedi@bws1.com.bz	BWS
Melisa Castillo	620-2642	melsacastillo@bws1.com.bz	BWS
Les Kaufman	617-407-3685	lesk@bu.edu	BV
Norlay Lamb	6302690	borealisdug@spkoo.com	CONCH
MATHEW James	668-9341	CONCHDANGRIGABELIZE@gmail	CONCH.
Elmerth Emy	669-93115		
W/pt/mk			

Village	Placencia
Shrimp Farms	Belize Aquaculture Ltd (BAL), Tropical Aquaculture Investment Ltd. (TAI), Royal Mayan Shrimp Farms Ltd. (Royal Mayan), Cardelli Farms Ltd. (Cardelli), Tex Mar Ltd. (Tex Mar)
Date	5 November 2014
Venue	Placencia Community Center
Time	6 – 7 pm
Attendants	11 persons + three B-EIA and p-SIA consultants, the country WWF representative and one representative of a shrimp farm. The village chairperson sent an excuse as she was sick. See list attendants

Two weeks before the meeting hard copies of the draft B-EIA/p-SIA reports of the five shrimp farms, including the conflict resolution policy, but exclusive of the appendices were delivered with the village council chairman. The complete documents were available online. Villagers were informed about the upcoming meeting by means of flyers and posters, word of mouth, advertisements in Reporter and Amandala newspapers, text messages, email messages, and Facebook postings.

All attendants were issued an agenda for the meeting, a hardcopy of Chapter 9.1.1 of the draft B-EIA/p-SIA reports of the farms, reflecting the topics discussed on July 22, 2014 and the Conflict Resolution Policy.

Minutes of the meeting:

1. Welcome- Consultant

Mr. Meerman introduced himself as well. He introduced the ASC process and the participating shrimp farms. He said that the issues that are going to be discussed were issues identified during the 1st meetings at the different communities.

2. Intro. Of attendees

The attendees introduced themselves. Placencia residents, village council member, BAL and WWF representative, SEA, and Independence Junior College Representatives were also present. The village council was present through the VC secretary. The village council chairperson sent an excuse as she was sick.

3. Intro on the ASC certification process.

He elaborated on the ASC process. The ASC is a leading certification and labelling programme for responsible seafood production. The farms have to go through 7 principles to get certified. He mentioned that the focus of this meeting is on two principles: Principle 2 and Principle 3 which relates to the B-EIA and p-SIA.

4. Issues that were brought forward during July Meeting among the communities.

These were the issues found at the 1st round of meetings:

- Employment provided is considered a positive impact.
- Some feel left out when it comes to employment opportunities.
- Pay is considered low.

- Shrimp farms can be hard to contact.
- Occasional bad smell emanating from dumped shrimp heads.
- Concerns about the water quality of Placencia Lagoon impacting aquatic flora and fauna.
- Cutting of mangroves.
- Question whether the ground water quality can be impacted.

5. Response to those issues by the Shrimp Farm representatives

Concerns about water quality of Placencia lagoon

Water quality is an important point in the ASC certification. Shrimp farms are stepping up their monitoring and they will be audited on this subject.

It is also a requirement under the Belize law; however the ASC is more strict with this monitoring.

Question asked about how often it is monitored: BAL says 20 ponds are sampled, the lagoon and the rivers up and downstream. These are sent to DOE every 3 months. Concern arose about the testing only been done once a month, citizens believe that a more vigorous testing should be done. Mr Meerman mentioned that DOE, the shrimp farms and BWS are monitoring and that DoE plans to combine all the data. SEA representative mentioned that 4 sets of data are coming out of the lagoon from 4 different organizations so you will be getting a broader data. His concern is also that a lot of data has been collected but he's uncertain if the data is readily available for access.

Cutting of mangroves:

- It was found that compared with the 1992 situation, hardly any mangrove was cut by the shrimp farms. The mangrove is disappearing from the peninsula not by the shrimp farms. Any mangrove lost was due to the creation of intake canals by the shrimp farms but this represents a minor acreage.

Occasional bad smell emanating from dumped shrimp heads:

- Not felt in Placencia. Shrimp heads are being buried to prevent attracting flies and other scavengers and prevent bad odors. A solid waste management plan (including shrimp waste) is being developed. Investigation is being made to see if the shrimp waste can be used as a resource.

Question whether the ground water quality can be impacted:

- At the moment, the shrimp farms are mostly found in savannah soils so the soil type is not conducive for seepage of saltwater into the soil (clay).
- We don't have data but under the ASC they will establish baseline data, need to collect data and identify points where they are going to monitor for salinization of the soils.

Employment Issues:

- Wages are subject to Belize Law and all farms pay above minimum wage. This is strictly controlled by the Labor Department.

- Most of the people from the communities don't know how to access the farm but because of this the BSGA will establish a community employment desk in the villages for people that would like to seek employment at the farms.

Shrimp farms can be hard to contact:

- Direct access to the farm is limited because of Bio-security considerations.

Other actions to improve community-farm relations:

- Contact between farm management and communities will be improved through twice yearly meetings with the communities.

Conflict Resolution Policy

He also went over the conflict resolution policy. This is done in all the farms. Mr. Meerman went over this policy and pointed out that it can be found on the hand-outs that all participants received. Because of this policy, you will get an answer should you have any issues. The same policy applies for suggestions as well. It will be reviewed and addressed within a 7 days period. He mentioned that the full conflict resolution policy and framework will be found in the final document, which will be deposited with both the village council and with SEA.

AUDIT Process

- Mr. Meerman went over the audit process. The shrimp farms will be audited by an external accredited auditor according to the 7 ASC principles.
- Certification will only be granted if the farm is found to be compliant with the majority of the standards.
- Audit will be repeated every year to assure continued compliance. The auditor will go over the documentation and it's very intensive. They will announce the audits 30 days ahead and will be on the website. Any stakeholder can contact the auditor and the auditor may also seek contact with stakeholders ahead of the audit. Draft audit report will be available on the same site for 10 working days for stakeholder comments

Comments from the public:

Suggested that SEA could be the medium where members of the community can go to look for employment on the shrimp farms and also provide their complaints here. BAL representative think that SEA should be the environmental link to the shrimp farm and the village council for social issues. BAL representative mentioned that they advertise job vacancies in newspapers, word of mouth, and radio announcement and job fairs.

What time or date do DOE plan to start the registry? Mr. Meerman: According to him they said in early 2015.

Will the registry be updated every 3 months? Answer: It will be uploaded anytime new data is being entered. That is what DOE told Mr. Meerman.

What is the role of the Dept of Agriculture? Answer: Dept of Agriculture does not play a significant role in the process.

Concern about why the effluent discharge information will not be made public by ASC. Answer: It is not the role of ASC to publicize the data, they will use the data only to verify compliance. Instead, the DoE is planning to make the data public.

Question about if they fail the audit do they get a go head to try again? Answer: Farms need to comply 100%, the auditor might find some minor non-compliance and will be given couple months to fix it.

Where the auditors coming from? Answer: Two accredited bodies one in California and Ecuador. The one coming to Belize is from Ecuador.

If they fail ASC and meet DOE standards will they be shut down or given a pass? Answer: if they fail ASC, the farm still has to meet DoE standards and theoretically, they can close operations down.

Meeting finished at 7pm

Presentation of the DRAFT B-EIA and p-SIA report for the shrimp farms (BAL, TAI, TEX MAR, Royal Mayan and Cardelli) in Seine Bight, including the community complaint resolution policy			
Village/Community	Placencia Village	Location:	Community Center in Placencia
Date:	5 November 2014	Starting Time:	5 pm
NAME	TELEPHONE NUMBER	EMAIL ADDRESS	ORGANIZATION
Isabelle GAYOT	626 71 44	isabelle.gayot@batshrimp.com	BAL
FRANCO BRAUS	+501 601 8401	geoteam@braus.it	GeoTeam
MATHEW JAMES	668-9341	caroladankirigazee@gnail	CONCH - CBC
Norlan Lomb	6302690	borealisdna@yaho.com	Marine Taxicoupa Dangvage +
Clifton Garbutt	636-3461	clifongee@yahoo.com	Indp. Junior College
Abigail Parcham-Garbutt	533 3377 621 4616	agarbutt@seabelize.org	Southern Environmental Association
Jenria Lozano	523-3396	placencavillagescouncil@gmail.com	P.V.C
!Hans... Maria	610-4358	...@... .org	WWF
Nicole Auri Gomez	523-3377	execdirector@seabelize.org	SEEA
Zylon Gomez	636-4130	dzgamez2003@yahoo.com	resident
HAROLD WALLON	625-8537	haroldlucio@yahoo.com	PLAC. Village Council
ANNELISE HAGAN	633 6599	science@seabelize.org	SEA / Marine Biologist
CARMEN STOWE	6018021	C.STOWE@gmail.com	

FIGURE 7, ATTENDANCE 2ND PLACENCIA MEETING, 5 NOVEMBER 2014

15.4. Appendix 2c: Transcript meetings with Seine Bight stakeholders

Seine Bight & Riversdale Community Meeting, July 22, 2014

Venue: Resource Center Seine Bight

Starting time 6.15 pm, ended 7.15 pm

1. Ms. Tineke welcomed the attendants.
 - a. A total seven persons attended the meeting. All attendants received a paper with general information about the ASC certification process, the ASC website, and contact addresses of pertinent governmental departments and the consultant.
 - b. Brief survey how attendants learned about the planned meeting (more than one option per person possible), based on the response of seven attendants:
 - Word of mouth: 4
 - Pamphlets: 2
 - Radio: 2
 - TV: none
2. She introduced herself as the consultant as well as her two assistants Lesbia Cruz, and Adrianna Vasquez
3. Consultant mentioned that 8 of the shrimp farms (biggest in the country) are in the process of getting an ASC certification. Names of the shrimp farms were presented on a wall poster and were included in the information sheet
4. Communities included in the Social Impact Assessment were presented on a wall poster
5. The ASC certification is like a consumer label such as a stamp of good behavior. It is not easy to get, shrimp farms have to comply with dozens of ASC standards. Buyers in foreign markets can select shrimps coming from an ASC certificated farm over other brands, in this way the certificated farm will increase its market. This will benefit the company, local employment opportunities, and the country. Because the shrimp farm has to comply with the ASC environmental and social principles, the adverse impact of the shrimp farms on these environments should lessen.
6. Environmental Compliance Plan (ECP) is a form of 'contract' between the developer and the Department of Environment; the ECP describes the plan of the development (shrimp farm) and its operations. It formulates the minimum level of monitoring in the case of shrimp farms basically water quality monitoring.

She referred to the wall posters and the 7 different ASC principles that the shrimp farms have to comply with. The farms will be audited for all seven principles.

Principle 3 was discussed at length to inform the attendants about this effort.
7. Ms. Tineke mentioned that her task is to listen to the communities to hear what they have to say about the shrimp farms. She mentioned that she is not here to give answers but to listen and to take the concerns to the shrimp farms and ask them how they are going to address the issues that were brought up.
8. How does it help the stakeholders? How do we know the outcome of this meeting? She mentioned that the minutes are being taken by a staff member and will make it available to members of the community. She asked if the attendants provided her with their emails. She mentioned that for Mullins River she provided them with hard copies of the minutes because they don't have internet access but here it should be easier. If they have comments, addition or changes let her know and she will include the comments of the attendants.

After meetings with the shrimp farms to discuss the issues that came forward during the community meetings and landowner consultations, a draft report will be made about how the

issues will be dealt with by the farms. The issues will be listed including the shrimp farm responses. How do we know that they will be dealt with? She mentioned Principle 3. The participating shrimp farms have different levels of organization, some have access to a larger administrative staff than others. She mentioned that her task for principle 3 is to get all farms organized to be ready for ASC certification. They can then apply for the ASC certification. For 30 days the request for auditing will be posted on the ASC website and during this period the stakeholders will be able to voice their concerns to the auditor in regards to the shrimp farm that is applying for the certification. When the auditors carry out their auditing, they can look into these concerns. When the auditor makes his draft report, this will be posted on the ASC website for 14 days, during this period stakeholders can make comments. This is an effort to make the whole auditing process transparent and to allow stakeholders direct input in the process.

Every year the auditor will come back and the shrimp farms will have to show progress in the fields that they were not complying with. The fields that were good in the first place should remain that way. The certificate is valid for 3 years.

9. The Seine Bight residents present did not see any benefit from the shrimp farms, only three residents are employed by the nearest shrimp farm.
10. Concerns and adverse impacts the Seine Bight residents present experienced:
 - Our peninsula is becoming a major tourist destination and a lot of development is occurring. They are of the opinion that the adverse effects (see below) of the shrimp farms are not good for these developments.
 - We have about 3 persons that work at the shrimp farm. In the past 21 people went to work at BAL. They didn't stay long. Wages were too low. They travelled by public transportation not by transportation provided by the shrimp farm. No stipend was given to travel. What earned 0.75 cent per box of shrimp in the processing plant, pays now at 0.45 cent. Watchmen at the ponds work for 12 hours with no booths (shelter). Long shifts and harsh conditions. The salary isn't good; they don't pay \$5.00 for an hour. The workers went to Human Resource Department of the shrimp farm, but that did not change things.
 - Resident believes that you don't get a job because you come from Seine Bight. He sent his resume via Internet but mentioned another village as his residence because he had the impression that Seine Bight had a stigma.
 - The shrimp farm has a workers bus that goes towards the other villages but not towards Seine Bight. No farm transportation is an obstacle as to why there are only few people from Seine Bight employed by the farm. It is believed that if a bus is sent this way will have more people willing to work there. Resident believes that they should give them a chance at employment regardless of where they reside
 - A resident sent in application form (he has associate degree) but was not employed. Another got an application form from the front gate..
 - Manatees are being killed off because wastes are being dumped into the lagoon which he believes is from the shrimp farm. Freshwater Creek is inhabitable, no more freshwater at the creek because he believes it has been polluted by the shrimp farm waste. Ms. Tineke mentioned that some of the shrimp farms have a water system as to how to treat disposed water. Another attendant mentioned a shrimp farm that has retention ponds but they need to expand these.

- Question about the ECP monitoring requirements: What is the radius of testing from the point where the effluent is being discharged and how far away from the facility should the shrimp farm test the water? At the mouth of the lagoon upstream, downstream and at the middle. Can be found in the ECP issued by DOE. Ms. Tineke mentioned that the monitoring of the water for the ASC certification will be done according to ASC standards which may be different from the monitoring done in the ECP from DOE. But shrimp farms have to comply with the national standards and regulations as well
 - Resident is concerned that the water quality isn't what it used to be. Fishes that were there before aren't there now. Black Fin shark are now seen the lagoon. A multitude of catfish are seen in the lagoon, more than before. The fish species known as "Crana" are not seen in the lagoon anymore.
 - A resident, who was employed by BAL for a short time, mentioned a stack of the farm's generator that emitted smelly exhaust gases. The resident believes that it is very dangerous for the employees and should be monitored (BAL).
 - Resident believes that the air pollution from the disposal of shrimp heads, which attracts vultures, should be taken into consideration.
 - Resident believes that they should have a job fair and provide transportation so that more people can be employed from Seine Bight.
 - Resident is concerned about dredging done near the lagoon (preparations of new ponds), it is very close to the lagoon. Afraid the mangrove is dying because of these activities.
11. Hire more people from Seine Bight, reduce pollution of the Lagoon, better manage the shrimp waste after processing, and look into the generator.
 12. One resident prefers to have no shrimp farm at all.
 13. Resident would prefer to have residential development over shrimp farms.
 14. People are afraid to complain at the farm
 15. One resident is of the opinion that 20-30 Seine Bight residents may be willing to work at the farm but the lack of farm transportation is prohibiting this.
 16. Apart from the village council, Seine Bight Women's Group or SEA can have a copy of the reports.No more questions
 17. Minutes of the meeting will be emailed to the attendants. Comments, corrections can be forwarded to the consultant
 18. During a second presentation the draft report will be presented and reviewed by the public

FIGURE 11. ATTENDANTS OF THE FIRST COMMUNITY MEETING IN SEINE BIGHT, 22 JULY 2014

Village/Community		Location:	
Seine Bight Village		Community Center at S.B.	
Date:		Starting Time:	
22 July 2014		5pm - 7:15 pm	
NAME	TELEPHONE NUMBER	EMAIL ADDRESS	ORGANIZATION
IAN MORRISON	610-1912	ian.morrison21@gmail.com	ENVIROPLAN
John Augustine	665-4483		S B V. C.
Benny Cacho	669-6958	cacho_benny@yahoo.com	
Melisa Castillo	620-7642	melsacastillo.bwsl.com.bz	BWS
Beverly Mohammedali	600-2899	beverly.mohammedali@bwsl.com.bz	BWS
Oscar Alonzo	600-3903	oscar.alonzo@bwsl.com.bz	BWS
Mitchell Martinez	652-0187 or 664-8205	bobmitchellmartinez@yahoo.com	Concerned Citizen

Village	Seine Bight
Shrimp Farms	Belize Aquaculture Ltd (BAL), Tropical Aquaculture Investment Ltd. (TAI), Royal Mayan Shrimp Farms Ltd. (Royal Mayan), Cardelli Farms Ltd. (Cardelli), Tex Mar Ltd. (Tex Mar)
Date	5 November 2014
Venue	Community Center Seine Bight
Time	2.15 – 3.30 pm
Attendants	11 persons, including the B-EIA and p-SIA consultants, the country WWF representative, one representative of a shrimp farm. See list attendants

Two weeks before the meeting hard copies of the draft B-EIA/p-SIA reports of the five shrimp farms, including the conflict resolution policy, but exclusive of the appendices were delivered with the village council chairman. The complete documents were available online. Villagers were informed about the upcoming meeting by means of flyers and posters, word of mouth, advertisements in Reporter and Amandala newspapers, text messages, email messages, and Facebook postings.

All attendants were issued an agenda for the meeting, a hardcopy of Chapter 9.1.1 of the draft B-EIA/p-SIA reports of the farms, reflecting the topics discussed on July 22, 2014 and the Conflict Resolution Policy.

Minutes of the meeting:

2. Welcome.

Welcome by the B-EIA consultant, Jan Meerman

3. Introduction of the attendees

The attendees also introduced themselves; three village council members, plus the past chairman , the BAL human resource manager, WWF representative and two members from Riversdale were present

4. Intro on the ASC certification process:

- Mr. Meerman had a PowerPoint presentation prepared. He showed the public the list of farms that are involved in the ASC certification process: Aqua Mar Belize Ltd, Bel-Euro Aquaculture Ltd, Belize Aquaculture Ltd, Cardelli Farms Ltd, Royal Mayan Shrimp Farms Ltd, Tex Mar Ltd, Tropical Aquaculture Investment Ltd, Paradise Shrimp Farm C.A. Ltd.
- He explained what the ASC process is. ASC is a leading certification and labelling programme for responsibly farmed seafood. He went over the 7 Principles that all the farms have to comply with if they want to get certified. These include: 2- Site farms in environmental suitable locations while conserving biodiversity and important natural ecosystems. 3- develop and operate farms with consideration for surrounding communities.
- He mentioned the focus of his consultancy was Principle 2 and Principle 3, which resulted in the combined the B-EIA and p-SIA report.

4. Issues that were brought forward during July 22, 2014 meeting in Seine Bight:

- Employment provided is considered a positive impact.
- Some feel left out when it comes to employment opportunities.

- Pay is considered low.
- Shrimp farms can be hard to contact.
- Occasional bad smell emanating from dumped shrimp heads.
- Concerns about the water quality of Placencia Lagoon impacting aquatic flora and fauna.
- Cutting of mangroves.
- Question whether the ground water quality can be impacted.

Response to those issues by the Shrimp Farm representatives

Concerns about the water quality of Placencia Lagoon:

- Water quality is an important point in the ASC certification. Shrimp farms are stepping up their monitoring program because it is a requirement of the ASC.
- One attendant raised the question about the salinity of the discharged water and the receiving water bodies: what will be the impact if water with a salinity of 35 ppt is discharged in water with a lower salinity? The BAL representatives explained that in the upper region of the Placencia Lagoon the salinity of the water can range from 15-35 ppt, depending on the season. The ecosystem is adapted to these changes. Consultant explained that in a lagoon in the north of the country, a similar change in salinity occurred over the seasons.
- Several organizations collect water quality data: the shrimp farms, DoE, BWSL. DoE is interested in combining all these data

Cutting of mangroves:

- It was found that compared with the 1992 situation, hardly any mangrove was cut by the shrimp farms. The mangrove is disappearing from the peninsula not by the shrimp farms. If lost was made it's to create canals by the shrimp farm but not immense lost to create an impact.
- BAL representative made it known that the mangroves are essential for the effluent discharge process, because it helps filter it and they also have to honor this so as to not lose their certifications. BAL representative emphasized that the BAL farm is located on higher grounds with little mangrove, no mangrove was cut to construct their ponds.
- Consultant remarked that mangrove on shrimp farm property is better protected than mangrove on national lands

Occasional bad smell emanating from dumped shrimp heads:

- Shrimp heads are being buried to prevent attracting flies and other scavengers and prevent bad odors. A solid waste management plan (including shrimp waste) is being developed. Investigation is being made to investigate the potential of shrimp waste as a resource
- Villagers in Seine Bight don't get the bad odor.

Question whether the ground water quality can be impacted:

- At the moment, the shrimp farms are mostly found in savannah soils so the soil type is not conducive for seepage of saltwater into the soil (clay). We don't have data but under the ASC they will establish baseline data, need to collect data and identify points where they are going to monitor for salinization of the soils.
- Ground water occurs in layers in Belize. You would sample from the surface soil and wells. The water for the community well is extracted from deep aquifers
- To prevent contamination of the ground water, the ASC, the shrimp farms have to monitor the occurrence of salinization of the soil.
- Question was raised by one attendant how deep the soil sample for monitoring of salinization had to be collected. This will be from the top soil layer.
- The water in the wells of the farm have also to be sampled and tested for salinity levels

Employment Issues:

- Wages are subject to Belize Law and all farms pay above minimum wage. This is strictly controlled by the Labor Department. The BSGA will establish a community employment desk in the villages.
- One attendant asked if an economic analysis of the financial benefits of the presence of shrimp farms on local communities. This information is not available (not part of this study), however each report has information about the origin of the employees

Contact with farms:

- Direct contact to farm is limited because of Bio-security considerations; that is why most shrimp farms have gates and limited access to the farms.

Other actions to improve community-farm relations

- Contact between farm management and communities will be improved through twice a year visits to the community.
- He also went over the conflict resolution policy. This is done in all the farms. Mr. Meerman went over this policy and it can be found on the handout. Because of this policy, you will get an answer. He made it known that the full Conflict Resolution Policy will be included in the final document. It will be found at the village council and at SEA.

The audit process

Mr. Meerman went over the audit process. The shrimp farms will be audited by an external accredited auditor according to the 7 ASC principles.

Certification will only be granted if the farm is found to be compliant with the majority of the standards.

Audit will be repeated every year to assure continued compliance. The auditor will go over the documentation and it's very intensive. They will announce the audits 30 days ahead and will be on the

website. Any stakeholder can contact the auditor and the auditor may also seek contact with stakeholders ahead of the audit. Draft audit report will be available on the same site for 10 working days for stakeholder comments

He provided a list of links where the ASC can be found and his website where the documents can be found.

6. Discussion

Questions were asked during the presentation of the various issues, see above. Mr. Williams reported on an excursion onto the Santa Maria Creek (BAL) and experiencing a foul smell. The Issue was not further discussed.

7. Conclusions:

The village council chairman Mr. Gusto Augustine emphasized that more dialogue between farms and village(s) is needed. The past chairman Mr. Williams commented that the report had generated a mass of information about the functioning of shrimp farms. He was of the opinion that the report was comprehensive and thorough.

8. Adjournment:

The meeting was adjourned at 3.30 pm

FIGURE 8. ATTENDANTS 2ND SEINE BIGHT MEETING, 5 NOVEMBER 2014

Presentation of the DRAFT B-EIA and p-SIA report for the shrimp farms (BAL, TAI, TEX MAR, Royal Mayan and Cardelli) in Seine Bight, including the community complaint resolution policy			
Village/Community	Seine Bight	Location:	Community Center in Seine Bight
Date:	5 November 2014	Starting Time:	2 pm
NAME	TELEPHONE NUMBER	EMAIL ADDRESS	ORGANIZATION
JUSTO AUGUSTINE	660-1637	justoaugustine57@gmail.com	SBVC
Anita Guzman	661-2809		SBVC
Alexander L Williams	601-2869	Villager	S.B.
Adriana Vasquez	635-5315	adriana.vasquez@gmail.com	Chair of the Area
Tinche Greenhills	834-4014	tinche.greenhills@gmail.com	p-SIA consultant
Mauricia Mejia	610-4858	mmesa@wvta.org	WWF
Isabelle Gayot	521 21 000 626 71 66	isabelle.gayot@bakshrimp.com	BAK
WARREN FLINT	681-2925	warflint@earthlink.net	RIVERSDALE, STAN CR DIST
NAUCY FLINT	610-2922	nancyflint@earthlink.net	RIVERSDALE, STAN CR DIST
Angel Moreno	660 3338		1/2p ngr JP
John P Augustine	660 2515	S.B.V	SBVC

15.5. Appendix 3: Transcript Phone Calls with land owners

TABLE 11. QUESTIONNAIRE

TRANSCRIPT PHONE CALLS LAND OWNERS		
Date phone call		July 22 nd 2014 : 11:27am
Name interviewer		Ms. Jacqueline Neal
Name land owner(s)		Mr. Percival Neal and Ms. Jacqueline Neal
Telephone number		523-3131
Email address land owner		pneal27@yahoo.com
Neighbour to (fill in name of the shrimp farm)		TAI
1	Is the interviewee neighbour of (name farm)? or at least within 500 m of it?	Only the road divides us.
2	2 a Is the interviewee owner/leaseholder/manager of the land?	Owner of the land
	2 b If not: who is? Name and contact number?	N.A.
	2c Does the interviewee/owner use the land? For what purpose?	Yes. Residential and Farm land
3	3 a Was the interviewee owner/lease holder of the land BEFORE or AFTER the shrimp farm was established?	Before the shrimp farm
	3 b When BEFORE: was the land owner informed by the owners of the shrimp farm about the intentions to establish a shrimp farm on the neighbouring land?	NO we weren't informed by Tropical but by Tex Mar that they were expanding their shrimp farm
	3c When BEFORE: did the interviewee have any concerns about the establishment of a shrimp farm on that land? (For example: loss of customary rights, loss of access to own property, pollution, diversion of water ways)	We see a bit of pollution when they flush out we see the mangroves dying. We had problem with access because at first the owner of the shrimp farm did not want us to drive through our own property. A gate was in place by the bridge at first was shut and Landowner couldn't access land but landowner contacted workers of TAI and problem was solved. They have access again.
	3 d When BEFORE: if the land owner had concerns about the plans, did he discuss these concerns	Was discussed with workers of TAI and let owner of TAI know or probably manager of Texmar made it know it TAI.

TRANSCRIPT PHONE CALLS LAND OWNERS

		with the shrimp farm owners?	
	3e	When AFTER: was the interviewee aware of the presence of the shrimp farm? If so: did this raise any concerns in regards to their own land?	
4	4a	Do the shrimp farm operations have any beneficial effect on their land? If yes, which? ((land value, access roads, access to electricity for instance	No benefits.
	4b	Which <u>negative effects?</u> (effluents discharge, loss of mangrove, increase of salinity, dying vegetation for example)	Loss of mangroves and twice they had instances of dumping of waste (shrimp head) on property but again this was resolved. Owners used the waste as fertilizers.
5	5a	If you experience <u>negative</u> impacts of the presence and operations of the farm, have you contacted the farm or governmental entity about your concerns?	Owner spoke with the workers of TAI who are very cooperative and relayed what was discussed with the owner.
	5b	If Yes: Who was contacted and what was the follow up of this contact?	Just with the workers of TAI not with the owner. They have fence and big dogs so not approachable. One of the dogs killed a pig of theirs.
	5c	If No: why not?	Because of the presence of the dogs.
6	6a	Are you regularly, occasionally or not at all in contact with the farm?	No, the owners are not in contact.
	6b	If YES: who initiated the contact?	
	6c	If YES: what topics have been discussed?	
	6d	If NO: would the land owner appreciate regular contact with the shrimp farm?	Yes to an extent because we are neighbours.
7		Do you have any development plans for the property?	At the moment no, because it is a small farm which they use for vacation purposes. They have three small houses. In the future however, their son who is a tour guide might want to go into

TRANSCRIPT PHONE CALLS LAND OWNERS

		<p>tourism and develop a tourist spot because the area is good for fishing. Put up cabins etc.</p> <p>Owner said her initial plan was to have the location set up as retreat for local people. A weekend getaway. Have a restaurant etc.</p>
8	Do you know other landowners adjacent to the farm? If so, do you have the name and contact info of this person?	Steve Christensen.
	Any other information of importance	<p>Lot of people benefit from the shrimp farms. Nothing negative to say but they did had their few run ins with TAI but were able to settle them and come to an agreement.</p>

15.6. Appendix 4: Consultations with the Department of the Environment

Consultation with Department of the Environment with Anthony Mai, head of monitoring section. July 24, 2014.

The discussion focussed on the certification project and general and the role that the DoE can play in this. Of particular interest were the data that are available as a result of the monitoring efforts carried out by the department.

Availability of an ECP: The DoE has an ECP of TAI on file.

Effluent discharge: each farm is only responsible for the quality of its wastewater. Farms have to test the water of various sources on a regular basis; results are supposed to be submitted to the Department of Environment (DoE). But compliance is minimal. Results of these tests as well as the data collected by the DoE are public, interested individuals and organizations theoretically have access to these files. But the way the results are filed (hardcopies only, no electronic database) makes it practically impossible to access the results in a quick and systematic manner. At the end of 2014, the Department will start a new on-line filing system (PRTR: Pollutant Release Transfer Registry) whereby each development that has a effluent discharge license, will have to file the results of their mandatory water testing online. This system should be open to the general public.

Cumulative effect: effluent discharge production by all shrimp farms is a task that has to be undertaken by the Department of Environment. This governmental entity is responsible for the collection of all water sample testing results carried out by the individual shrimp farms as well by the department itself. All this information should be open and transparent, accessible to the public as well as the farms.

Groundwater quality: several of the shrimp farms have to test the quality of their groundwater; the Environmental Compliance Plan (ECP) of TAI does not include such a condition. Nevertheless, the It is suggested that the management includes the monitoring of its well water on a monthly basis and during the months March through May on a bi-weekly basis. Main parameter to monitor is salinity.

Consultation with Department of the Environment with Anthony Mai, head of monitoring section.
September 8, 2014.

The discussion was a follow up of the meeting of July 24th. The department was presented with the draft version of the chapter "Deeper research needed on important impacts on the physical, biological and social environment" in which the various mitigating actions are discussed.

Mr. Mai confirmed the intention to implement the PRTR: Pollutant Release Transfer Registry by the end of the year and that the general public would have access to it.

As for the actions proposed, Mr. Mai suggested some further actions:

- That farms would supply information on the amount of effluent produced. This could go hand in hand with a record of how much water was abstracted (measuring pumping time with a known pump capacity). Effluent release could also be a simple calculation of the pond volume times the amount of times that is was drained + any partial releases.
- Also that effluent had to meet standards. In the case of "polishing" through vegetation such as mangrove, what counts would be the water quality at the point of release from the settling pond into the mangrove.

15.7. Appendix 5: Consultation with Ministry of Labour, Local Government, Rural Development, NEMO and Immigration.

Meeting with Ernest Banner, Rural Development Coordinator. September 8, 2014

The discussion was a follow up of an informal meeting in August 2014 during which the ASC certification project was brought forward.

Mr. Banner was presented with the draft version of the chapter "Deeper research needed on important impacts on the physical, biological and social environment" in which the various mitigating actions are discussed.

In particular, the chapter "**Hiring of employees outside reasonable commuting distance**" was discussed. It was felt that Belizeans from all over the country had the right to find employment with the shrimp farms, but it was recognized that movement of workers could lead to migration, which in its turn could affect available services in the settlement areas. Mr. Banner confirmed that his department with the mandate to research and address this potential issue.

15.8. Appendix 6. Consultation with Social Investment Fund

Communication with William Lamb, Executive Director of the Social Investment Fund.

Mr. Lamb supported the idea of gathering data about national migration patterns, the outcome of the survey could benefit the undertakings of SIF. Although, needed expansion of social services based on the trends observed, still has to be proposed to the relevant ministries to ensure the activities will fit their respective policies for the country.

15.9. Appendix 7. Consultation with the National Integrated Water Resources Agency.

Communication with Paul Flowers, director of NIWRA was initiated on September 8, 2014. Comments by Mr. Flowers are pending.

15.10. Appendix 8. Escape Recovery Plan

For any shrimp farming facility prevention of escapes is simply a sound business practice. Ensuring that shrimp cannot escape, particularly in large quantities, means a higher volume of production. However, there are instances when through accidental (or sometimes deliberate) means shrimp do escape. Such accidents include equipment failure or malfunction. In such an event it is necessary to recover as much of the escapees as possible.

Purpose:

To provide a mechanism and procedure for the control and recovery of shrimp that escape from the farm unit.

Scope

This protocol covers all members of the Belize Shrimp Growers Association who are involved in ASC certification.

Accompanying policies

DoE Effluent Regulations

Farm's Environmental Compliance Plan

Fisheries Department Policy on non-native species

Justification

The ShAD Standards require a minimum barrier (artificial or natural) between farm and aquatic or marine environments as defined in national legislation at the time of construction.

The ShAD Standards acknowledge that farms generally have little control over the land practices between their own holdings and shorelines. Including a minimum buffer strip between farms and oceans ensures that ponds cannot occupy the sea-water interface, which is a high risk farming area where it is more difficult to control environmental events that are directly linked to escapes and disease transfer. A second benefit of coastal buffers is that they ensure that communities have an area in which to access marine resources.

Riparian habitats are considered important in tropical agricultural countries; however, there is no one-size-fits-all description of an ideal riparian buffer strip. While other ShAD Standards address water quality and salinization, recommended widths for ecological concerns in buffer strips typically are much wider than those recommended for water quality concerns.

Corridors are essential ecological features that allow the movement and dispersal of organisms between suitable patches within a landscape. Maintaining the potential for organisms to move freely and within the safety of appropriate habitat is essential for the maintenance of essential functions such as foraging and breeding.

Instead of using a discrete and generic coastal buffer recommendation, countries are strongly encouraged to use the most current numerical models available (e.g., Koh et al. 2009) to examine how coastal buffers can vary along different sections of coastline. Such efforts are outside the scope of auditing or B-EIAs but are acknowledged as best practice and would make use of the best available science. Collaborative efforts by national agencies and local municipalities should make such recommendations public, then work to attain such buffers, potentially buying back developed land in areas that would be best used for coastal protection.

Procedures

- 1) The farm will create a settling or retention pond that is designed and maintained in accordance with their Environmental Compliance Plan.
- 2) The settling or retention pond will have a control structure that controls the movement of water into the surrounding environment vegetation along the retention pond must be natural and permanent, and must be dominated by natural vegetation cover consistent with natural endemic riparian zones within less than five km of the farm in question.
- 3) The width of any buffer or barrier zones must comply with DoE requirements at the time of construction
- 4) For coastlines, lagoons or lakes, the zone of natural or restored vegetation will be a minimum of 100 meters wide.
- 5) For confined natural watercourses, such as rivers or streams, the zone of natural or restored vegetation must be at least 100 meters wide (on each side of the stream).
- 6) Screens also shall be installed at all pond outlets to prevent the escape of shrimp from farms.
- 7) All incidents of escapes will be properly documented on the appropriate pond record form and reported to the Fisheries and Agriculture Departments
- 8) The retention pond will be sampled once per month to determine the level of the population of cultured species in it.
- 9) Using appropriate methods, attempts will be made to harvest as much of the cultured species from the retention pond as possible.
- 10) All sampling and harvest from the retention pond will be appropriately documented.
- 11) Procedures will be reviewed and revised on a regular basis.

15.11. Appendix 9. List of species of conservatism concern in Belize

Order	Species	English Name	IUCN class	Status in Belize	Justification
Amphibians	<i>Agalychnis moreletii</i>		CR	DD	3
Amphibians	<i>Bolitoglossa dofleini</i>		NT	DD	3
Amphibians	<i>Bufo campbelli</i>		NT	LC	3
Amphibians	<i>Smilisca cyanosticta</i>		NT	DD	3
Amphibians	<i>Eleutherodactylus chac</i>		NT	DD	3
Amphibians	<i>Eleutherodactylus laticeps</i>		NT	DD	3
Amphibians	<i>Eleutherodactylus leprus</i>		VU	DD	3
Amphibians	<i>Eleutherodactylus psephosypharus</i>		VU	DD	3
Amphibians	<i>Eleutherodactylus sabrinus</i>		EN	DD	3
Amphibians	<i>Eleutherodactylus sandersoni</i>		EN	DD	3
Amphibians	<i>Hyla bromeliacia</i>		EN	DD	3
Amphibians	<i>Rana juliani</i>		NT	NT	2
Birds	<i>Agamia agami</i>	Agami Heron		VU	6,8
Birds	<i>Ajaia ajaja</i>	Roseate Spoonbill		VU	6
Birds	<i>Amazona oratrix</i>	Yellow-Headed Amazon		EN	4,8,9,10
Birds	<i>Amazona xantholora</i>	Yellow-Lored Parrot		VU	10
Birds	<i>Anous stolidus</i>	Brown Noddy		VU	6
Birds	<i>Ara macao cyanoptera</i>	Scarlet Macaw		EN	4,8,9,11
Birds	<i>Ardea herodias</i>	Great Blue Heron		VU	4,10
Birds	<i>Asio stygius</i>	Stygian Owl		VU	10
Birds	<i>Bubo virginianus</i>	Great Horned Owl		VU	10
Birds	<i>Cairina moschata</i>	Muscovy Duck		VU	4
Birds	<i>Columba leucocephala</i>	White-Crowned Pigeon	NT	VU	4,7
Birds	<i>Contopus cooperi</i>	Olive-Sided Flycatcher	NT	DD	
Birds	<i>Crax rubra</i>	Great Curassow	NT	VU	4,9
Birds	<i>Dendrocygna autumnalis</i>	Black-Bellied Whistling Duck		VU	4,10
Birds	<i>Dendrocygna bicolor</i>	Fulvous Whistling Duck		VU	4,10
Birds	<i>Dendroica cerulea</i>	Cerulean Warbler	VU	VU	
Birds	<i>Egretta rufescens</i>	Reddish Egret		VU	6,10
Birds	<i>Egretta thula</i>	Snowy Egret		VU	6,10
Birds	<i>Egretta tricolor</i>	Tricolored Heron		Vu	6,10
Birds	<i>Electron carinatum</i>	Keel-Billed Motmot		VU	3,8,9
Birds	<i>Eudocimus albus</i>	White Ibis		VU	6
Birds	<i>Falco deiroleucus</i>	Orange-Breasted Falcon		VU	8,9
Birds	<i>Fregata magnificens</i>	Magnificent Frigatebird		VU	6
Birds	<i>Harpia harpyja</i>	Harpy Eagle	NT	CR	4,7,9,10
Birds	<i>Harpyhaliaetus solitarius</i>	Solitary Eagle	NT	CR	4,7,10
Birds	<i>Jabiru mycteria</i>	Jabiru		VU	4,7,9,10, 11
Birds	<i>Laterallus jamaicensis</i>	Black Rail	NT	DD	
Birds	<i>Melanoptila glabrirostris</i>	Black Catbird	NT	NT	8,9
Birds	<i>Meleagris ocellata</i>	Ocellated Turkey	NT	VU	3,4,9

Order	Species	English Name	IUCN class	Status in Belize	Justification
Birds	<i>Morphnus guianensis</i>	Crested Eagle	NT	CR	4,7,10
Birds	<i>Mycteria americana</i>	Wood Stork		VU	4,6,10
Birds	<i>Nyctanassa violacea</i>	Yellow-Crowned Night-Heron		VU	6
Birds	<i>Nycticorax nycticorax</i>	Black-Crowned Night-Heron		VU	6
Birds	<i>Pelecanus occidentalis</i>	Brown Pelican		VU	6,10
Birds	<i>Penelope purpurascens</i>	Crested Guan		VU	4
Birds	<i>Phalacrocorax auritus</i>	Double-Crested Cormorant		VU	4,6,10
Birds	<i>Phalacrocorax brasilianus</i>	Neotropic Cormorant		VU	4,6,10
Birds	<i>Pionopsitta haematotis</i>	Brown-Hooded Parrot		DD	
Birds	<i>Sarcoramphus papa</i>	King Vulture		VU	7,8,9
Birds	<i>Sterna anaethetus</i>	Bridled Tern		VU	6
Birds	<i>Sterna antillarum</i>	Least Tern		VU	6
Birds	<i>Sterna dougallii</i>	Roseate Tern		VU	6
Birds	<i>Sterna fuscata</i>	Sooty Tern		VU	6
Birds	<i>Sterna sandvicensis</i>	Sandwich Tern		VU	6
Birds	<i>Sula leucogaster</i>	Brown Booby		VU	6
Birds	<i>Sula sula</i>	Red-Footed Booby		VU	6
Corals	<i>Anthozoa – all species</i>	Gorgonians, Telestaceans, Soft Corals, Black Corals, Stony Corals	VU	VU	9
Corals	<i>Hydrozoa – all species</i>	Fire Corals, Lace Corals	VU	VU	9
Fishes	<i>Balistes vetula</i>	Queen Triggerfish	VU	VU	4,5
Fishes	<i>Dermatolepis inermis</i>	Marbled Grouper	VU	MD	1,4,5,6
Fishes	<i>Epinephelus itajara</i>	Goliath Grouper	CR	MD	1,4,5,6,9
Fishes	<i>Epinephelus morio</i>	Red Grouper	NT	MD	1,4,5,6
Fishes	<i>Epinephelus nigritus</i>	Warsaw Grouper	CR	MD	1,4,5,6
Fishes	<i>Epinephelus niveatus</i>	Snowy Grouper	VU	MD	1,4,5,6
Fishes	<i>Epinephelus striatus</i>	Nassau Grouper	EN	MD	1,4,5,6,9
Fishes	<i>Hippocampus erectus</i>	Lined Seahorse	VU	DD	
Fishes	<i>Hippocampus reidi</i>	Longsnout Seahorse	DD	DD	
Fishes	<i>Lachnolaimus maximus</i>	Hogfish	VU	VU	4,5
Fishes	<i>Lutjanus analis</i>	Mutton Snapper	VU	VU	4,5,6
Fishes	<i>Lutjanus cyanopterus</i>	Cubera Snapper	VU	VU	4,5,6
Fishes	<i>Mycteroperca venenosa</i>	Yellowfin Grouper	NT	MD	1,4,5,6
Fishes	<i>Pagrus pagrus</i>	Red Porgy	EN	DD	4,5
Fishes	<i>Sanopus astrifer</i>	Whitespotted Toadfish	VU	DD	
Fishes	<i>Sanopus greenfieldorum</i>	Whiteline Toadfish	VU	DD	
Fishes	<i>Sanopus reticulatus</i>	Reticulated Toadfish	VU	DD	
Fishes	<i>Sanopus splendidus</i>	Splendid Toadfish	VU	DD	
Fishes	<i>Scarus guacamaia</i>	Rainbow Parrotfish	VU	VU	4,5
Fishes-Sharks	<i>Carcharhinus leucas</i>	Bull Shark	NT	NT	4,5,9,10
Fishes-	<i>Carcharhinus limbatus</i>	Blacktip Shark	NT	NT	4,5,9,10

Order	Species	English Name	IUCN class	Status in Belize	Justification
Sharks					
Fishes-Sharks	<i>Carcharhinus longimanus</i>	Oceanic Whitetip Shark	NT	NT	4,5,9,10
Fishes-Sharks	<i>Carcharhinus plumbeus</i>	Sandbar Shark	NT	NT	4,5,9,10
Fishes-Sharks	<i>Galeocerdo cuvier</i>	Tiger Shark	NT	NT	4,5,9,10
Fishes-Sharks	<i>Isurus oxyrinchus</i>	Shortfin Mako	NT	NT	4,5,9,10
Fishes-Sharks	<i>Mustelus canis</i>	Dusky Smoothhound	NT	DD	
Fishes-Sharks	<i>Negaprion brevirostris</i>	Lemon Shark	NT	NT	4,5,9,10
Fishes-Sharks	<i>Prionace glauca</i>	Blue Shark	NT	NT	4,5,9,10
Fishes-Sharks	<i>Pristis pectinata</i>	Smalltooth Sawfish	NT	CR	4,5
Fishes-Sharks	<i>Pristis perotteti</i>	Largetooth Sawfish	CR	CR	4,5
Fishes-Sharks	<i>Rhincodon typus</i>	Whale Shark	VU	VU	7,8,9
Fishes-Sharks	<i>Sphyrna lewini</i>	Scalloped Hammerhead	NT	NT	4,5,9,10
Fishes-Sharks	<i>Sphyrna mokarran</i>	Great Hammerhead	DD	DD	4,5,9,10
Fishes-Sharks	<i>Sphyrna zygaena</i>	Smooth Hammerhead	NT	NT	4,5,9,10
Mammals	<i>Alouatta pigra</i>	Mexican Black Howler Monkey	EN	VU	3,9
Mammals	<i>Ateles geoffroyi</i>	Central American Spider Monkey	VU	VU	9
Mammals	<i>Balaenoptera physalus</i>	Fin Whale	EN	DD	9
Mammals	<i>Balantiopteryx io</i>	Thomas's Sac-winged Bat,	EN	VU	8
Mammals	<i>Bauerus dubiaquercus</i>	Van Gelder's Bat,	VU	VU	8
Mammals	<i>Cabassous centralis</i>	Northern Naked-Tailed Armadillo	DD	DD	8
Mammals	<i>Centronycteris centralis</i>	Shaggy Bat	VU	VU	8
Mammals	<i>Dicotyles pecari</i>	White-Lipped Peccary	VU	VU	4,7,10
Mammals	<i>Globicephala macrorhynchus</i>	Short-finned Pilot Whale	VU	DD	9
Mammals	<i>Herpailurus yaguarondi</i>	Yaguarundi	VU	LC	10
Mammals	<i>Leopardus pardalis</i>	Ocelot	VU	VU	4,9,10
Mammals	<i>Leopardus wiedii</i>	Margay	VU	VU	9,10
Mammals	<i>Lontra longicaudis</i>	Neotropical River Otter	DD	VU	10
Mammals	<i>Mazama pandora</i>	Yucatan Brown Brocket Deer	DD	DD	3,4
Mammals	<i>Molossops greenhalli</i>	Greenhall's mastiff Bat	VU	VU	8
Mammals	<i>Mormoops megalphylla</i>	Ghost-faced Bat	NT	NT	8
Mammals	<i>Myotis elegans</i>	Elegant Myotis	VU	VU	8

Order	Species	English Name	IUCN class	Status in Belize	Justification
Mammals	<i>Panthera onca</i>	Jaguar	NT	NT	4,7,9,10
Mammals	<i>Physeter macrocephalus</i>	Sperm Whale	VU	DD	9
Mammals	<i>Pteronotus gymnonotus</i>	Greater Naked-back Bat	NT	NT	8
Mammals	<i>Puma concolor</i>	Puma	NT	NT	4,7,9,10
Mammals	<i>Stenella frontalis</i>	Atlantic Spotted Dolphin	VU	VU	9
Mammals	<i>Stenella longirostris</i>	Spinner Dolphin	VU	DD	9
Mammals	<i>Steno bredanensis</i>	Rough-Toothed Dolphin	VU	DD	9
Mammals	<i>Tapirus bairdii</i>	Central American Tapir	EN	VU	4,9,10
Mammals	<i>Thyroptera tricolor</i>	Spix's Disk-winged Bat,	VU	VU	8
Mammals	<i>Trichechus manatus</i>	West Indian Manatee	VU	VU	4,9
Mammals	<i>Turiopsis truncatus</i>	Bottlenose Dolphin	VU	VU	9
Plants	<i>Ceratozamia robusta</i>		VU	VU	3
Plants	<i>Pithecellobium johansenii</i>		EN	DD	
Plants	<i>Quiina schippii</i>		EN	DD	
Plants	<i>Schippia concolor</i>	Mountain Pimento	VU	LC	2
Plants	<i>Swietenia macrophylla</i>	Large-Leaved Mahogany	VU	VU	5,9
Plants	<i>Zamia prasina</i>		CR	DD	2,8
Plants	<i>Zamia</i> sp. Nov.	Un-described Zamia		VU	2,8
Plants	<i>Zamia variegata</i>	Variegated Zamia	EN	VU	3,9
Reptiles	<i>Caretta caretta</i>	Loggerhead	EN	EN	4,5,6,9
Reptiles	<i>Chelonia mydas</i>	Green Turtle	EN	EN	4,5,6,9
Reptiles	<i>Crocodylus acutus</i>	American Crocodile		NT	4,9,10
Reptiles	<i>Crocodylus moreletii</i>	Morelet's Crocodile		CD	3,4,5,9,10
Reptiles	<i>Dermatemys mawii</i>	Central American River Turtle	EN	EN	3,4,5,9
Reptiles	<i>Dermochelys coriacea</i>	Leatherback	CR	CR	4,9
Reptiles	<i>Eretmochelys imbricata</i>	Hawksbill Turtle	CR	CR	4,5,6,9
Reptiles	<i>Phyllodactylus insularis</i>	Island Gecko		NT	2
Reptiles	<i>Staurotypus triporcatus</i>	Mexican Musk Turtle	NT	NT	4
Reptiles	<i>Trachemys scripta</i>	Common Slider	NT	LC	4

Justification:

12. The Fisheries Department expressed that it is aware of present trends in the global populations of all Groupers. Measures have been taken to protect spawning sites of these fish in Belize and the Department is attempting to introduce measures that will allow it to sustainably manage this resource. For this reason the grouper all have been placed in the CD = Conservation Dependant category.
13. Endemic species
14. Small Range – Regional Endemic
15. Hunted – Fished
16. Economic importance
17. Colony breeder (restricted number of breeding colonies/locations)
18. Needs large range
19. Specialized ecological requirements
20. Charismatic species drawing national and international attention
21. Prosecuted as perceived pest
22. Genetically different from South American counterpart

15.12. Appendix 10. Flora and Fauna species list

Based on a datasearch of the Biodiversity and Environmental Research Data System of Belize
<http://www.biodiversity.bz> see Map 5 for collection points.

FAMILY	GENUS and SPECIES	COLLOQUIAL
Fishes		
Anguillidae	<i>Anguilla rostrata</i>	American Eel
Antherinidae	<i>Antherinella sp. nov. 1</i>	Belize Silverside
Characidae	<i>Astyanax fasciatus</i>	Banded Astyanax(Billum)
Characidae	<i>Brycon guatemalensis</i>	MachacaMacabil
Characidae	<i>Hyphessobrycon compressus</i>	Mayan Tetra(Billum)
Engraulidae	<i>Anchoa cayorum</i>	Key anchovy
Poeciliidae	<i>Belonesox belizanus</i>	TopminnowPike killifish
Poeciliidae	<i>Gambusia luma</i>	Sleek Mosquitofish
Poeciliidae	<i>Gambusia nicaraguensis</i>	Nicaraguan Mosquitofish
Poeciliidae	<i>Gambusia sexradiata</i>	Teardrop Mosquito
Poeciliidae	<i>Heterandria bimaculata</i>	Twospot Livebearer
Poeciliidae	<i>Poecilia mexicana</i>	Shortfin Molly
Poeciliidae	<i>Xiphophorus hellerii</i>	Green Swordtail
Poeciliidae	<i>Xiphophorus maculatus</i>	Southern Platyfish
Rivulidae	<i>Rivulus tenuis</i>	Dogtooth Rivulus
Carangidae	<i>Caranx latus</i>	Horse-eye jack
Centropomidae	<i>Centropomus ensiferus</i>	Swordspine Snook
Cichlidae	<i>Amphilophus robertsoni</i>	False Firemouth Cichlid
Cichlidae	<i>Archocentrus spilurus</i>	Blue-eye Cichlid
Cichlidae	<i>Cichlasoma octofasciatum</i>	Jack Dempsey
Cichlidae	<i>Cichlasoma salvini</i>	Yellow Belly Cichlid
Cichlidae	<i>Cichlasoma urophthalmus</i>	Mexican MojarraMayan Cichlid
Cichlidae	<i>Parachromis friedrichsthalii</i>	Yellowjacket Cichlid(Mus mus)
Cichlidae	<i>Petenia splendida</i>	Bay Snook(Blanco)
Cichlidae	<i>Thorichthys meeki</i>	Firemouth Cichlid(Panya gial)
Cichlidae	<i>Vieja intermedia</i>	Northern Checkmark Cichlid
Cichlidae	<i>Vieja maculicauda</i>	Blackbelt Cichlid
Cichlidae	<i>Vieja synspila</i>	Redhead Cichlid
Eleotridae	<i>Eleotris amblyopsis</i>	Large-scaled Spinycheek Sleeper
Eleotridae	<i>Eleotris pisonis</i>	Spinycheek Sleeper
Eleotridae	<i>Gobiomorus dormitor</i>	Bigmouth Sleeper

Gerreidae	<i>Eucinostomus melanopterus</i>	Flagfin mojarra
Gobiidae	<i>Awaous banana</i>	River Goby
Haemulidae	<i>Pomadasys croco</i>	Burro Grunt
Lutjanidae	<i>Lutjanus griseus</i>	Grey snapper
Heptapteridae	<i>Rhamdia guatemalensis</i>	Guatemalan Chulln
Heptapteridae	<i>Rhamdia laticauda</i>	Filespine Chulin
Synbranchidae	<i>Ophisternon aenigmaticum</i>	Obscure Swamp Eel
Tetraodontidae	<i>Sphoeroides testudineus</i>	Checkered puffer
Amphibians		
FAMILY	GENUS and SPECIES	COLLOQUIAL
Leptodactylidae	<i>Leptodactylus melanonotus</i>	Sabinal Frog
Birds		
FAMILY	GENUS and SPECIES	COLLOQUIAL
Accipitridae	<i>Buteo magnirostris</i>	Roadside Hawk
Cathartidae	<i>Cathartes burrovianus</i>	Lesser Yellow-headed Vulture
Anatidae	<i>Cairina moschata</i>	Muscovy Duck
Charadriidae	<i>Charadrius vociferus</i>	Killdeer
Laridae	<i>Sterna sandvicensis</i>	Sandwich Tern
Scolopacidae	<i>Gallinago delicata</i>	Wilson's Snipe
Ciconiidae	<i>Jabiru mycteria</i>	Jabiru
Ciconiidae	<i>Mycteria americana</i>	Wood Stork
Columbidae	<i>Columbina minuta</i>	Plain-breasted Ground-Dove
Columbidae	<i>Patagioenas cayennensis</i>	Pale-vented Pigeon
Alcedinidae	<i>Chloroceryle aenea</i>	American Pygmy Kingfisher
Motmotidae	<i>Momotus momota</i>	Blue-crowned Motmot
Falconidae	<i>Caracara cheriway</i>	Crested Caracara
Rallidae	<i>Gallinula chloropus</i>	Common Moorhen
Emberizidae	<i>Ammodramus savannarum</i>	Grasshopper Sparrow
Emberizidae	<i>Whatever</i>	Whatever
Mimidae	<i>Mimus gilvus</i>	Tropical Mockingbird
Tyrannidae	<i>Pyrocephalus rubinus</i>	Vermilion Flycatcher
Tyrannidae	<i>Tyrannus savana</i>	Fork-tailed Flycatcher
Ardeidae	<i>Ardea alba</i>	Great Egret
Ardeidae	<i>Ardea herodias</i>	Great Blue Heron
Ardeidae	<i>Bubulcus ibis</i>	Cattle Egret
Ardeidae	<i>Egretta caerulea</i>	Little Blue Heron
Ardeidae	<i>Egretta thula</i>	Snowy Egret

Ardeidae	<i>Nyctanassa violaceus</i>	Yellow-crowned Night-Heron
Ardeidae	<i>Tigrisoma mexicanum</i>	Bare-throated Tiger-Heron
Pelecanidae	<i>Pelecanus occidentalis</i>	Brown Pelican
Picidae	<i>Melanerpes formicivorus</i>	Acorn Woodpecker
Psittacidae	<i>Amazona autumnalis</i>	Red-lored Parrot
Psittacidae	<i>Amazona oratrix</i>	Yellow-headed Parrot
Anhingidae	<i>Anhinga anhinga</i>	Anhinga
Phalacrocoracidae	<i>Phalacrocorax auritus</i>	Double-crested Cormorant
Butterflies		
FAMILY	GENUS and SPECIES	COLLOQUIAL
Hesperiidae	<i>Cogia calchas</i>	Mimosa Skipper
Hesperiidae	<i>Heliopetes arsalte</i>	Veined White-Skipper
Hesperiidae	<i>Urbanus simplicius</i>	Plain Longtail
Lycaenidae	<i>Eumaeus toxea</i>	Mexican Cycadian
Lycaenidae	<i>Hemiargus hanno</i>	Hanno Blue
Lycaenidae	<i>Pseudolycaena marsyas damo</i>	Sky-blue Greatstreak
Nymphalidae	<i>Agraulis vanillae incarnata</i>	
Nymphalidae	<i>Chlosyne lacinia</i>	
Nymphalidae	<i>Cyllopsis gemma freemanni</i>	Gemmed Satyr
Nymphalidae	<i>Euptoieta hegesia hoffmanni</i>	
Nymphalidae	<i>Hamadryas guatemalena guatemalena</i>	
Nymphalidae	<i>Hermeuptychia hermes</i>	
Nymphalidae	<i>Junonia evarete zonalis</i>	
Nymphalidae	<i>Manataria maculata</i>	
Nymphalidae	<i>Opsiphanes cassina fabricii</i>	
Papilionidae	<i>Battus polydamas polydamas</i>	Polydamas Swallowtail
Pieridae	<i>Appias drussilla drussilla</i>	Florida White
Pieridae	<i>Eurema albula</i>	Ghost Yellow
Pieridae	<i>Eurema दौरा lydia</i>	Barred Yellow
Pieridae	<i>Eurema lisa lisa</i>	Little Yellow
Pieridae	<i>Phoebis agarithe agarithe</i>	Large Orange Sulphur
Pieridae	<i>Phoebis argante argante</i>	Apricot Sulphur
Pieridae	<i>Phoebis philea philea</i>	Orange-barred Sulphur
Pieridae	<i>Phoebis sennae marcellina</i>	Cloudless Sulphur
Riodinidae	<i>Anteros carausius carausius</i>	Fuzzy-legged Metalmark
Riodinidae	<i>Calephelis clenchi</i>	
Riodinidae	<i>Juditha caucana</i>	Common Lemmark
Riodinidae	<i>Mesosemia lamachus</i>	Purple-washed Eyemark

Mammals		
FAMILY	GENUS and SPECIES	COLLOQUIAL
Cervidae	<i>Odocoileus virginianus truei</i>	White-tailed Deer
Procyonidae	<i>Nasua narica</i>	Coatimundi
Procyonidae	<i>Procyon lotor shufeldti</i>	Raccon
Delphinidae	<i>Tursiops truncatus</i>	Bottlenose Dolphin
Dasyproctidae	<i>Dasyprocta punctata</i>	Central American Agouti
Trichechidae	<i>Trichechus manatus manatus</i>	West Indian Manatee
Reptiles		
FAMILY	GENUS and SPECIES	COLLOQUIAL
Crocodylidae	<i>Crocodylus moreletii</i>	Morelet's Crocodile
Colubridae	<i>Masticophis mentovarius</i>	Neotropical Whipsnake
Colubridae	<i>Symphimus mayae</i>	Yucat'an White-lipped Snake
Corytophanidae	<i>Basiliscus vittatus</i>	Brown Basilisk
Kinosternidae	<i>Kinosternon scorpioides</i>	Scorpion Mud Turtle
Plants		
FAMILY	GENUS and SPECIES	COLLOQUIAL
Zamiaceae	<i>Zamia prasina</i>	
Hydrocharitaceae	<i>Halophila baillonii</i>	
Araceae	<i>Spathiphyllum blandum</i>	
Arecaceae	<i>Acoelorrhaphe wrightii</i>	
Arecaceae	<i>Bactris mexicana</i>	
Arecaceae	<i>Thrinax radiata</i>	
Amaryllidaceae	<i>Hymenocallis littoralis</i>	
Hypoxidaceae	<i>Curculigo scorzonerifolia</i>	
Hypoxidaceae	<i>Hypoxis humilis</i>	
Bromeliaceae	<i>Werauhia gladioliflora</i>	
Burmanniaceae	<i>Burmannia capitata</i>	
Burmanniaceae	<i>Burmannia flava</i>	
Commelinaceae	<i>Tripogandra serrulata</i>	
Eriocaulaceae	<i>Eriocaulon fuliginosum</i>	
Eriocaulaceae	<i>Eriocaulon kinlochii</i>	
Eriocaulaceae	<i>Paepalanthus lamarckii</i>	
Eriocaulaceae	<i>Syngonanthus bartlettii</i>	
Mayacaceae	<i>Mayaca fluviatilis</i>	
Xyridaceae	<i>Xyris ambigua</i>	
Cyperaceae	<i>Bulbostylis paradoxa</i>	

Cyperaceae	<i>Bulbostylis tenuifolia</i>
Cyperaceae	<i>Cladium jamaicense</i>
Cyperaceae	<i>Cyperus compressus</i>
Cyperaceae	<i>Cyperus haspan</i>
Cyperaceae	<i>Cyperus imbricatus</i>
Cyperaceae	<i>Cyperus luzulae</i>
Cyperaceae	<i>Eleocharis cellulosa</i>
Cyperaceae	<i>Eleocharis elongata</i>
Cyperaceae	<i>Eleocharis geniculata</i>
Cyperaceae	<i>Eleocharis pachystyla</i>
Cyperaceae	<i>Fimbristylis autumnalis</i>
Cyperaceae	<i>Fimbristylis complanata</i>
Cyperaceae	<i>Fimbristylis cymosa</i>
Cyperaceae	<i>Fimbristylis dichotoma</i>
Cyperaceae	<i>Fimbristylis spadicea</i>
Cyperaceae	<i>Fimbristylis vahlii</i>
Cyperaceae	<i>Fuirena campotricha</i>
Cyperaceae	<i>Lagenocarpus guianensis</i>
Cyperaceae	<i>Pycreus polystachyos</i>
Cyperaceae	<i>Rhynchospora barbata</i>
Cyperaceae	<i>Rhynchospora cephalotes</i>
Cyperaceae	<i>Rhynchospora curvula</i>
Cyperaceae	<i>Rhynchospora exaltata</i>
Cyperaceae	<i>Rhynchospora eximia</i>
Cyperaceae	<i>Rhynchospora filifolia</i>
Cyperaceae	<i>Rhynchospora filiformis</i>
Cyperaceae	<i>Rhynchospora globosa</i>
Cyperaceae	<i>Rhynchospora globularis recognita</i>
Cyperaceae	<i>Rhynchospora globularis var. globularis</i>
Cyperaceae	<i>Rhynchospora hirsuta</i>
Cyperaceae	<i>Rhynchospora mexicana</i>
Cyperaceae	<i>Rhynchospora pusilla</i>
Cyperaceae	<i>Rhynchospora radicans microcephala</i>
Cyperaceae	<i>Rhynchospora rugosa</i>
Cyperaceae	<i>Rhynchospora tenerrima tenerrima</i>
Cyperaceae	<i>Rhynchospora tenuis</i>
Cyperaceae	<i>Rhynchospora trispicata</i>
Cyperaceae	<i>Scleria bracteata</i>
Cyperaceae	<i>Scleria ciliata</i>
Cyperaceae	<i>Scleria distans</i>

Cyperaceae	<i>Scleria georgiana</i>
Cyperaceae	<i>Scleria melaleuca</i>
Cyperaceae	<i>Scleria reticularis</i>
Cyperaceae	<i>Scleria secans</i>
Cyperaceae	<i>Scleria tenella</i>
Cyperaceae	<i>Torulinium odoratum</i>
Dioscoreaceae	<i>Dioscorea floribunda</i>
Dioscoreaceae	<i>Dioscorea matagalpensis</i>
Haemodoraceae	<i>Xiphidium caeruleum</i>
Iridaceae	<i>Alophia silvestris</i>
Iridaceae	<i>Cipura campanulata</i>
Iridaceae	<i>Sisyrinchium subcernuum</i>
Orchidaceae	<i>Campylocentrum hondurense</i>
Orchidaceae	<i>Campylocentrum poeppigii</i>
Orchidaceae	<i>Habenaria brownelliana</i>
Orchidaceae	<i>Habenaria trifida</i>
Orchidaceae	<i>Myrmecophila tibicinis</i>
Orchidaceae	<i>Scaphyglottis prolifera</i>
Orchidaceae	<i>Spiranthes torta</i>
Orchidaceae	<i>Trigonidium egertonianum</i>
Poaceae	<i>Aristida appressa</i>
Poaceae	<i>Aristida purpurascens tenuispicata</i>
Poaceae	<i>Axonopus poiophyllus</i>
Poaceae	<i>Dichantherium portoricense</i>
Poaceae	<i>Dichantherium strigosum strigosus</i>
Poaceae	<i>Eragrostis atrovirens</i>
Poaceae	<i>Eragrostis hypnoides</i>
Poaceae	<i>Eragrostis maypurensis</i>
Poaceae	<i>Eustachys petraea</i>
Poaceae	<i>Hypogynium virgatum</i>
Poaceae	<i>Ichnanthus pallens</i>
Poaceae	<i>Ischaemum latifolium</i>
Poaceae	<i>Lasiacis rugelii rugelii</i>
Poaceae	<i>Panicum caricoides</i>
Poaceae	<i>Panicum cayennense</i>
Poaceae	<i>Panicum elephantipes</i>
Poaceae	<i>Panicum hirtum</i>
Poaceae	<i>Panicum laxum</i>
Poaceae	<i>Panicum pilosum</i>
Poaceae	<i>Panicum rudgei</i>

Poaceae	<i>Panicum tenerum</i>	
Poaceae	<i>Paspalum conjugatum</i>	
Poaceae	<i>Paspalum lineare</i>	
Poaceae	<i>Paspalum multicaule</i>	
Poaceae	<i>Paspalum pectinatum</i>	
Poaceae	<i>Paspalum pulchellum</i>	
Poaceae	<i>Pennisetum setosum</i>	
Poaceae	<i>Phragmites australis</i>	
Poaceae	<i>Setaria parviflora</i>	
Poaceae	<i>Sporobolus virginicus</i>	
Poaceae	<i>Thrasya trinitensis</i>	
Poaceae	<i>Tripsacum latifolium</i>	
Marantaceae	<i>Maranta arundinacea</i>	
Musaceae	<i>Musa paradisiaca</i>	Banana, Guineo, Plantain, Platano, Haas
Lycopodiaceae	<i>Lycopodiella caroliniana meridionalis</i>	
Lycopodiaceae	<i>Lycopodiella cernua</i>	
Araliaceae	<i>Dendropanax arboreus</i>	
Aristolochiaceae	<i>Aristolochia schippii</i>	Contribo, Guaco
Asteraceae	<i>Acmella pilosa</i>	
Asteraceae	<i>Acmella filipes cayenensis</i>	
Asteraceae	<i>Ageratum radicans</i>	
Asteraceae	<i>Calea jamaicensis</i>	
Asteraceae	<i>Calea longipedicellata</i>	
Asteraceae	<i>Clibadium eggersii</i>	
Asteraceae	<i>Cyanthillium cinereum</i>	
Asteraceae	<i>Eclipta prostrata</i>	
Asteraceae	<i>Elephantopus mollis</i>	
Asteraceae	<i>Emilia fosbergii</i>	
Asteraceae	<i>Goldmanella sarmentosa</i>	
Asteraceae	<i>Lepidaploa salzmännii</i>	
Asteraceae	<i>Lepidaploa tortuosa</i>	
Asteraceae	<i>Perymenium gymnomoloides</i>	
Asteraceae	<i>Wedelia acapulcensis ramosissima</i>	
Asteraceae	<i>Wedelia acapulcensis</i>	
Asteraceae	<i>Wedelia acapulcensis parvicesps</i>	
Aizoaceae	<i>Mollugo verticillata</i>	
Amaranthaceae	<i>Chamissoa altissima altissima</i>	
Casuarinaceae	<i>Casuarina equisetifolia</i>	
Aquifoliaceae	<i>Ilex guianensis</i>	

Aquifoliaceae	<i>Ilex guianensis</i>	
Celastraceae	<i>Hippocratea volubilis</i>	
Hippocrateaceae	<i>Cheiloclinium belizense</i>	
Dilleniaceae	<i>Curatella americana</i>	
Dilleniaceae	<i>Curatella americana</i>	
Dilleniaceae	<i>Davilla kunthii</i>	
Dilleniaceae	<i>Davilla kunthii</i>	
Dilleniaceae	<i>Doliocarpus dentatus dentatus</i>	
Dilleniaceae	<i>Doliocarpus multiflorus</i>	
Dilleniaceae	<i>Tetracera volubilis</i>	Sandpaper Vine
Sapotaceae	<i>Chrysophyllum mexicanum</i>	
Sapotaceae	<i>Manilkara zapota</i>	
Symplocaceae	<i>Symplocos jurgensenii</i>	
Symplocaceae	<i>Symplocos martinicensis</i>	
Euphorbiaceae	<i>Alchornea latifolia</i>	
Euphorbiaceae	<i>Chamaesyce hyssopifolia</i>	
Euphorbiaceae	<i>Croton repens</i>	
Euphorbiaceae	<i>Croton trinitatis</i>	
Euphorbiaceae	<i>Dalechampia schippii</i>	
Euphorbiaceae	<i>Pera arborea</i>	
Euphorbiaceae	<i>Pera barbellata</i>	
Euphorbiaceae	<i>Pera arborea</i>	
Euphorbiaceae	<i>Pera barbellata</i>	
Fabaceae - Caesalpinioideae	<i>Chamaecrista desvauxii mollissima</i>	
Fabaceae - Caesalpinioideae	<i>Chamaecrista desvauxii mollissima</i>	
Fabaceae - Caesalpinioideae	<i>Chamaecrista diphylla</i>	
Fabaceae - Caesalpinioideae	<i>Chamaecrista fagonioides fagonioides</i>	
Fabaceae - Caesalpinioideae	<i>Chamaecrista flexuosa flexuosa</i>	
Fabaceae - Caesalpinioideae	<i>Chamaecrista flexuosa flexuosa</i>	
Fabaceae - Caesalpinioideae	<i>Chamaecrista hispidula</i>	
Fabaceae - Caesalpinioideae	<i>Chamaecrista kunthiana</i>	
Fabaceae - Caesalpinioideae	<i>Chamaecrista nictitans patellaria</i>	
Fabaceae - Caesalpinioideae	<i>Senna undulata</i>	
Fabaceae - Caesalpinioideae	<i>Senna undulata</i>	
Fabaceae - Faboideae	<i>Aeschynomene histrix incana</i>	
Fabaceae - Faboideae	<i>Aeschynomene paniculata</i>	
Fabaceae - Faboideae	<i>Calopogonium mucunoides</i>	
Fabaceae - Faboideae	<i>Centrosema virginianum</i>	
Fabaceae - Faboideae	<i>Clitoria falcata</i>	
Fabaceae - Faboideae	<i>Clitoria guianensis</i>	

Fabaceae - Faboideae	<i>Crotalaria sagittalis</i>	
Fabaceae - Faboideae	<i>Desmodium barbatum</i>	
Fabaceae - Faboideae	<i>Dioclea virgata</i>	
Fabaceae - Faboideae	<i>Gliricidia sepium</i>	
Fabaceae - Faboideae	<i>Lonchocarpus rugosus</i>	
Fabaceae - Faboideae	<i>Macroptilium gracile</i>	
Fabaceae - Faboideae	<i>Ormosia velutina</i>	
Fabaceae - Faboideae	<i>Stylosanthes viscosa</i>	
Fabaceae - Faboideae	<i>Tephrosia nitens</i>	
Fabaceae - Faboideae	<i>Vigna linearis</i>	
Fabaceae - Faboideae	<i>Zornia reticulata</i>	
Fabaceae - Mimosoideae	<i>Abarema idiopoda</i>	
Fabaceae - Mimosoideae	<i>Calliandra houstoniana calothyrsus</i>	
Fabaceae - Mimosoideae	<i>Inga pinetorum</i>	
Fabaceae - Mimosoideae	<i>Mimosa albida albida</i>	
Fabaceae - Mimosoideae	<i>Mimosa pudica unijuga</i>	
Fabaceae: Mimosoideae	<i>Acacia mangium</i>	
Fabaceae: Mimosoideae	<i>Cojoba arborea arborea</i>	
Fabaceae: Mimosoideae	<i>Cojoba graciliflora</i>	
Fabaceae: Mimosoideae	<i>Inga belizensis</i>	
Fabaceae: Mimosoideae	<i>Inga pinetorum</i>	
Fabaceae: Mimosoideae	<i>Inga punctata</i>	Paterno
Fabaceae: Mimosoideae	<i>Inga thibaudiana</i>	
Fabaceae: Mimosoideae	<i>Mimosa albida albida</i>	
Fabaceae: Mimosoideae	<i>Mimosa tarda</i>	
Fabaceae: Mimosoideae	<i>Pithecellobium keyense</i>	
Fabaceae: Papilionoideae	<i>Aeschynomene americana</i>	
Fabaceae: Papilionoideae	<i>Andira inermis</i>	
Fabaceae: Papilionoideae	<i>Codariocalyx gyroides</i>	Charles Wright Plant
Fabaceae: Papilionoideae	<i>Eriosema crinitum crinitum</i>	
Fabaceae: Papilionoideae	<i>Gliricidia maculata</i>	
Fabaceae: Papilionoideae	<i>Gliricidia sepium</i>	
Fabaceae: Papilionoideae	<i>Lonchocarpus pentaphyllus</i>	
Fabaceae: Papilionoideae	<i>Machaerium cirrhiferum</i>	
Fabaceae: Papilionoideae	<i>Machaerium isadelphum</i>	
Fabaceae: Papilionoideae	<i>Ormosia velutina</i>	
Fabaceae: Papilionoideae	<i>Pachyrhizus erosus</i>	
Fagaceae	<i>Quercus oleoides</i>	
Fagaceae	<i>Quercus oleoides</i>	
Apocynaceae	<i>Allamanda cathartica</i>	

Apocynaceae	<i>Asclepias curassavica</i>	
Apocynaceae	<i>Cameraria latifolia</i>	
Apocynaceae	<i>Mandevilla subsagittata</i>	
Apocynaceae	<i>Matelea campechiana</i>	
Apocynaceae	<i>Metastelma stenomeres</i>	
Apocynaceae	<i>Rhabdadenia biflora</i>	
Apocynaceae	<i>Thevetia ahouai</i>	
Asclepiadaceae	<i>Blepharodon mucronatum</i>	
Asclepiadaceae	<i>Matelea campechiana</i>	
Asclepiadaceae	<i>Metastelma schlechtendalii</i>	
Gentianaceae	<i>Coutoubea spicata</i>	
Gentianaceae	<i>Curtia tenuifolia tenella</i>	
Gentianaceae	<i>Schultesia brachyptera</i>	
Gentianaceae	<i>Schultesia guianensis</i>	
Loganiaceae	<i>Strychnos brachistantha</i>	
Loganiaceae	<i>Strychnos peckii</i>	
Oxalidaceae	<i>Oxalis frutescens angustifolia</i>	
Boraginaceae	<i>Cordia bicolor</i>	
Lamiaceae	<i>Hyptis conferta</i>	
Lamiaceae	<i>Hyptis lantanifolia</i>	
Lamiaceae	<i>Hyptis conferta</i>	
Lamiaceae	<i>Marsypianthes chamaedrys</i>	
Verbenaceae	<i>Citharexylum caudatum</i>	
Verbenaceae	<i>Lantana camara</i>	
Verbenaceae	<i>Tamonea spicata</i>	
Verbenaceae	<i>Tamonea spicata</i>	
Verbenaceae	<i>Vitex gaumeri</i>	
Verbenaceae	<i>Vitex kuylenii</i>	
Lauraceae	<i>Cassytha filiformis</i>	
Lauraceae	<i>Cassytha filiformis</i>	
Lauraceae	<i>Nectandra cuspidata</i>	
Lauraceae	<i>Nectandra longicaudata</i>	
Monimiaceae	<i>Mollinedia guatemalensis</i>	
Monimiaceae	<i>Siparuna thecaphora</i>	
Erythroxylaceae	<i>Erythroxylum guatemalense</i>	
Annonaceae	<i>Annona glabra</i>	
Annonaceae	<i>Xylopia frutescens</i>	
Myristicaceae	<i>Compsoeura sprucei</i>	
Myristicaceae	<i>Virola koschnyi</i>	
Bombacaceae	<i>Pachira aquatica</i>	Provision Tree

Elaeocarpaceae	<i>Sloanea tuerckheimii</i>	
Malvaceae	<i>Hibiscus costatus</i>	
Malvaceae	<i>Hibiscus costatus</i>	
Malvaceae	<i>Melochia spicata</i>	
Malvaceae	<i>Sida linifolia</i>	
Malvaceae	<i>Sida linifolia</i>	
Malvaceae	<i>Trichospermum grewiifolium</i>	
Malvaceae	<i>Urena lobata</i>	
Malvaceae	<i>Waltheria indica</i>	
Sterculiaceae	<i>Helicteres guazumifolia</i>	
Sterculiaceae	<i>Melochia spicata</i>	
Tiliaceae	<i>Luehea seemanii</i>	
Tiliaceae	<i>Triumfetta lappula</i>	
Myricaceae	<i>Myrica cerifera</i>	
Myricaceae	<i>Myrica cerifera</i>	
Combretaceae	<i>Bucida buceras</i>	
Combretaceae	<i>Combretum laxum</i>	
Combretaceae	<i>Terminalia amazonia</i>	
Melastomataceae	<i>Aciotis rostellata</i>	
Melastomataceae	<i>Acisanthera crassipes</i>	
Melastomataceae	<i>Acisanthera quadrata</i>	
Melastomataceae	<i>Clidemia capitellata capitellata</i>	
Melastomataceae	<i>Clidemia novemnervia</i>	
Melastomataceae	<i>Clidemia sericea</i>	
Melastomataceae	<i>Clidemia strigillosa</i>	
Melastomataceae	<i>Clidemia strigillosa</i>	
Melastomataceae	<i>Conostegia caelestis</i>	
Melastomataceae	<i>Conostegia icosandra</i>	
Melastomataceae	<i>Henriettea succosa</i>	
Melastomataceae	<i>Miconia albicans</i>	
Melastomataceae	<i>Miconia ciliata</i>	
Melastomataceae	<i>Miconia holosericea</i>	
Melastomataceae	<i>Miconia hondurensis</i>	
Melastomataceae	<i>Miconia lacera</i>	
Melastomataceae	<i>Miconia lundelliana</i>	
Melastomataceae	<i>Miconia prasina</i>	
Melastomataceae	<i>Miconia schippii</i>	
Melastomataceae	<i>Miconia stenostachya</i>	
Melastomataceae	<i>Miconia affinis</i>	
Melastomataceae	<i>Miconia albicans</i>	Cerin

Melastomataceae	<i>Miconia chrysophylla</i>	
Melastomataceae	<i>Miconia ciliata</i>	
Melastomataceae	<i>Miconia lundelliana</i>	
Melastomataceae	<i>Miconia prasina</i>	
Melastomataceae	<i>Miconia schippii</i>	
Melastomataceae	<i>Miconia tomentosa</i>	
Melastomataceae	<i>Mouriri exilis</i>	Puruch'ahin (Q), Cacho Venando Hembra (S)
Melastomataceae	<i>Nepsera aquatica</i>	
Melastomataceae	<i>Pterolepis stenophylla</i>	
Melastomataceae	<i>Tibouchina aspera</i>	
Melastomataceae	<i>Tococa guianensis</i>	
Myrtaceae	<i>Calyptranthes cuneifolia</i>	
Myrtaceae	<i>Chamguava schippii</i>	
Myrtaceae	<i>Eugenia faramoides</i>	
Myrtaceae	<i>Eugenia flavoviridis</i>	
Myrtaceae	<i>Eugenia aeruginea</i>	
Myrtaceae	<i>Myrciaria floribunda</i>	
Myrtaceae	<i>Psidium guineense</i>	
Myrtaceae	<i>Psidium salutare</i>	
Myrtaceae	<i>Psidium guineense</i>	
Droseraceae	<i>Drosera capillaris</i>	
Droseraceae	<i>Drosera capillaris</i>	
Cabombaceae	<i>Brasenia schreberi</i>	
Piperaceae	<i>Piper jacquemontianum</i>	
Piperaceae	<i>Piper jacquemontianum</i>	
Malpighiaceae	<i>Byrsonima crassifolia</i>	
Malpighiaceae	<i>Heteropterys laurifolia</i>	
Malpighiaceae	<i>Hiraea fagifolia</i>	
Malpighiaceae	<i>Stigmaphyllon ellipticum</i>	
Malpighiaceae	<i>Tetrapteryx arcana</i>	
Polygalaceae	<i>Bredemeyera lucida</i>	
Polygalaceae	<i>Polygala adenophora</i>	
Polygalaceae	<i>Polygala asperuloides</i>	
Polygalaceae	<i>Polygala hygrophila</i>	
Polygalaceae	<i>Polygala longicaulis</i>	
Polygalaceae	<i>Polygala variabilis</i>	
Polygalaceae	<i>Polygala adenophora</i>	
Polygalaceae	<i>Polygala hygrophila</i>	
Polygalaceae	<i>Polygala trichosperma</i>	

Vochysiaceae	<i>Vochysia hondurensis</i>	Yemeri
Polygonaceae	<i>Coccoloba belizensis</i>	
Polygonaceae	<i>Coccoloba hondurensis</i>	
Polygonaceae	<i>Coccoloba reflexiflora</i>	
Polygonaceae	<i>Coccoloba uvifera</i>	
Proteaceae	<i>Roupala montana</i>	
Proteaceae	<i>Roupala montana</i>	
Vitaceae	<i>Cissus gossypiifolia</i>	
Rhizophoraceae	<i>Cassipourea guianensis</i>	
Rhizophoraceae	<i>Rhizophora mangle</i>	Red Mangrove
Chrysobalanaceae	<i>Chrysobalanus icaco</i>	
Chrysobalanaceae	<i>Hirtella racemosa hexandra</i>	
Chrysobalanaceae	<i>Hirtella racemosa hexandra</i>	
Chrysobalanaceae	<i>Licania hypoleuca hypoleuca</i>	
Chrysobalanaceae	<i>Licania sparsipilis</i>	
Connaraceae	<i>Connarus lambertii</i>	
Rubiaceae	<i>Alibertia edulis</i>	
Rubiaceae	<i>Alibertia edulis</i>	
Rubiaceae	<i>Amaioua corymbosa</i>	
Rubiaceae	<i>Appunia guatemalensis</i>	
Rubiaceae	<i>Chomelia protracta</i>	
Rubiaceae	<i>Coccocypselum herbaceum</i>	
Rubiaceae	<i>Diodia apiculata</i>	
Rubiaceae	<i>Diodia sarmentosa</i>	
Rubiaceae	<i>Guettarda combsii</i>	Glassywood
Rubiaceae	<i>Mitracarpus rhadinophyllus</i>	
Rubiaceae	<i>Morinda royoc</i>	
Rubiaceae	<i>Psychotria capitata</i>	
Rubiaceae	<i>Psychotria deflexa</i>	
Rubiaceae	<i>Psychotria poeppigiana</i>	
Rubiaceae	<i>Randia monantha</i>	
Rubiaceae	<i>Spermacoce latifolia</i>	
Rubiaceae	<i>Spermacoce suaveolens</i>	
Rubiaceae	<i>Spermacoce verticillata</i>	
Rubiaceae	<i>Uncaria tomentosa</i>	
Loranthaceae	<i>Psittacanthus pinicola</i>	
Loranthaceae	<i>Struthanthus cassythoides</i>	
Loranthaceae	<i>Struthanthus orbicularis</i>	Mistletoe
Olacaceae	<i>Schoepfia schreberi</i>	
Viscaceae	<i>Phoradendron quadrangulare</i>	

Anacardiaceae	<i>Anacardium occidentale</i>	
Anacardiaceae	<i>Metopium brownei</i>	
Burseraceae	<i>Bursera simaruba</i>	
Burseraceae	<i>Bursera simaruba</i>	Gumbo Limbo
Rutaceae	<i>Citrus aurantium</i>	
Sapindaceae	<i>Cupania spectabilis</i>	
Sapindaceae	<i>Dodonaea viscosa</i>	
Sapindaceae	<i>Matayba apetala</i>	
Simaroubaceae	<i>Simarouba glauca</i>	
Acanthaceae	<i>Aphelandra scabra</i>	
Acanthaceae	<i>Odontonema albiflorum</i>	
Bignoniaceae	<i>Arrabidaea chica</i>	
Bignoniaceae	<i>Arrabidaea florida</i>	
Bignoniaceae	<i>Crescentia cujete</i>	
Bignoniaceae	<i>Paragonia pyramidata</i>	
Lentibulariaceae	<i>Utricularia amethystina</i>	
Lentibulariaceae	<i>Utricularia hispida</i>	
Lentibulariaceae	<i>Utricularia juncea</i>	
Lentibulariaceae	<i>Utricularia purpurea</i>	
Lentibulariaceae	<i>Utricularia simulans</i>	
Lentibulariaceae	<i>Utricularia subulata</i>	
Oleaceae	<i>Chionanthus panamensis</i>	
Scrophulariaceae	<i>Agalinis hispidula</i>	
Scrophulariaceae	<i>Angelonia ciliaris</i>	
Scrophulariaceae	<i>Buchnera pusilla</i>	
Scrophulariaceae	<i>Russelia sarmentosa</i>	
Scrophulariaceae	<i>Russelia sarmentosa</i>	
Convolvulaceae	<i>Evolvulus alsinoides</i>	
Convolvulaceae	<i>Evolvulus sericeus</i>	
Convolvulaceae	<i>Ipomoea anisomeres</i>	
Convolvulaceae	<i>Ipomoea imperati</i>	
Convolvulaceae	<i>Jacquemontia tamnifolia</i>	
Convolvulaceae	<i>Merremia aturensis</i>	
Convolvulaceae	<i>Merremia cissoides</i>	
Convolvulaceae	<i>Odonellia hirtiflora</i>	
Menyanthaceae	<i>Nymphoides indica</i>	
Solanaceae	<i>Schwenkia americana</i>	
Solanaceae	<i>Solanum cordovense</i>	
Clusiaceae	<i>Calophyllum brasiliense rekoii</i>	
Clusiaceae	<i>Clusia massoniana</i>	

Clusiaceae	<i>Hypericum aphyllum</i>	
Clusiaceae	<i>Hypericum terrae-firmae</i>	
Clusiaceae	<i>Symphonia globulifera</i>	Leche amarillo, Waika Chewstick, Can-i-lech, Lech, k'han-lech
Clusiaceae	<i>Vismia macrophylla</i>	
Ochnaceae	<i>Ouratea nitida</i>	
Ochnaceae	<i>Sauvagesia erecta</i>	
Quiinaceae	<i>Quiina schippii</i>	
Theaceae	<i>Ternstroemia tepezapote</i>	
Cecropiaceae	<i>Cecropia peltata</i>	Trumpet Tree
Moraceae	<i>Brosimum guianense</i>	
Moraceae	<i>Brosimum lactescens</i>	
Moraceae	<i>Ficus popenoei</i>	
Ulmaceae	<i>Trema micrantha</i>	
Lacistemataceae	<i>Lacistema aggregatum</i>	
Passifloraceae	<i>Passiflora biflora</i>	
Passifloraceae	<i>Passiflora ciliata</i>	
Passifloraceae	<i>Passiflora serratifolia</i>	
Passifloraceae	<i>Passiflora urbaniana</i>	
Turneraceae	<i>Piriqueta cistoides</i>	
Turneraceae	<i>Turnera aromatica</i>	
Turneraceae	<i>Turnera scabra</i>	
Turneraceae	<i>Turnera aromatica</i>	
Violaceae	<i>Hybanthus calceolaria</i>	
Pinaceae	<i>Pinus caribaea hondurensis</i>	
Podocarpaceae	<i>Podocarpus guatemalensis</i>	
Blechnaceae	<i>Blechnum serrulatum</i>	
Dennstaedtiaceae	<i>Lindsaea lancea lancea</i>	
Dennstaedtiaceae	<i>Lindsaea quadrangularis subulata</i>	
Polypodiaceae	<i>Neurodium lanceolatum</i>	

15.13. Appendix 11. Wildlife record wildlife cameras

Silver Creek/Santa Maria Creek Corridor		Jenkins Creek Corridor	
Date	Species	Date	Species
3-Jun	Brown Four-eyed Opossum	8-Jun	Nine-banded Armadillo
4-Jun	Brown Four-eyed Opossum	9-Jun	Agouti
5-Jun	Gray-necked Woodrail	12-Jun	Nine-banded Armadillo
7-Jun	Brown Four-eyed Opossum	14-Jun	Agouti
7-Jun	Gray-necked Woodrail	23-Jun	Nine-banded Armadillo
7-Jun	Green Iguana	23-Jun	Nine-banded Armadillo
8-Jun	Brown Four-eyed Opossum	25-Jun	Agouti
8-Jun	Great Curassow	26-Jun	White-nosed Coati
8-Jun	Green Iguana	27-Jun	Nine-banded Armadillo
9-Jun	Brown Four-eyed Opossum	28-Jun	Nine-banded Armadillo
9-Jun	Gray-necked Woodrail	28-Jun	White-nosed Coati
9-Jun	Red-Brocket Deer	29-Jun	Agouti
10-Jun	Green Iguana	1-Jul	Agouti
11-Jun	Brown Four-eyed Opossum	4-Jul	Jaguar
11-Jun	Great Curassow	8-Jul	Mouse Opossum
12-Jun	Clay-colored Trush	11-Jul	Mouse Opossum
12-Jun	Green Iguana	14-Jul	Mouse Opossum
13-Jun	Brown Four-eyed Opossum	21-Jul	Agouti
13-Jun	Great Curassow	24-Jul	White-nosed Coati
14-Jun	Brown Four-eyed Opossum	25-Jul	Paca
14-Jun	Great Curassow	31-Jul	Agouti
15-Jun	Great Curassow	4-Aug	Mouse Opossum
15-Jun	Green Iguana	5-Aug	Mouse Opossum
16-Jun	Brown Four-eyed Opossum	6-Aug	Mouse Opossum
17-Jun	Brown Four-eyed Opossum	9-Aug	Paca
18-Jun	Brown Four-eyed Opossum	18-Aug	Paca
18-Jun	Ruddy Quail Dove	19-Aug	Paca
19-Jun	Brown Four-eyed Opossum	20-Aug	Paca
20-Jun	Brown Four-eyed Opossum	21-Aug	Paca
22-Jun	Brown Four-eyed Opossum	22-Aug	Paca
24-Jun	White-tailed Deer	23-Aug	Mouse Opossum
26-Jun	Great Curassow	25-Aug	Paca
27-Jun	Green Iguana	28-Aug	Nine-banded Armadillo
27-Jun	Nine-banded Armadillo	29-Aug	Paca
28-Jun	Great Curassow	30-Aug	Nine-banded Armadillo
28-Jun	Great Curassow	30-Aug	Paca
28-Jun	Green Iguana	4-Sep	Paca
29-Jun	Bare-throated Tiger Heron		
29-Jun	Great Curassow		
29-Jun	Paca		
30-Jun	Paca		

	Silver Creek/Santa Maria Creek Corridor	Jenkins Creek Corridor
3-Jul	Brown Four-eyed Opossum	
3-Jul	Paca	
4-Jul	Green Iguana	
4-Jul	Paca	
6-Jul	Paca	
8-Jul	Bare-throated Tiger Heron	
8-Jul	paca	
9-Jul	Bare-throated Tiger Heron	
9-Jul	Nine-banded Armadillo	
9-Jul	Paca	
9-Jul	Red-Brocket Deer	
15-Jul	Moscovy Ducks	
20-Jul	Paca	
22-Jul	paca	
25-Jul	Brown Four-eyed Opossum	
27-Jul	White-nosed Coati	
6-Aug	Kinkajou	
9-Aug	Gray Fox	
9-Aug	White-tailed Deer	
10-Aug	Gray Fox	
11-Aug	White-tailed Deer	
13-Aug	Great Curassow	
15-Aug	Gray Fox	
17-Aug	Gray Fox	
18-Aug	Gray Fox	
19-Aug	Hawk	
21-Aug	Gray Fox	
22-Aug	Gray Fox	
23-Aug	Gray Fox	
3-Sep	Great Curassow	
9-Sep	White-tailed Deer	
14-Sep	White-tailed Deer	
22-Sep	White-tailed Deer	

15.14. Appendix 12. Bird observations

Based on field visits to all participating farms by consultant team from June 2014 to September 2014. Species in Blue field are species found at the actual shrimp ponds, Species in a greenish field were recorded in the surrounding environment.

	Paradise	BelEuro	Paradise	BAL	TexMar 1	TexMar2	Aquamar	Bel-Euro	Royal Maya	BAL	Paradise	Paradise	TexMar 1	Cardelli	Royal Maya	TexMar 2	BAL	Aquamar	Texmar 1
	2-Jun	3-Jun	25-Jun	6-Aug	7-Aug	7-Aug	8-Aug	8-Aug	8-Aug	8-Aug	9-Aug	3-Sep	3-Sep	4-Sep	4-Sep	4-Sep	5-Sep	5-Sep	5-Sep
Waterfowl																			
Black-bellied Whistling-Duck <i>Dendrocygna autumnalis</i>	40		80	4	75	6		24				10	80	2		2		60	
Muscovy Duck <i>Cairina moschata</i>	2																		
Blue-winged Teal <i>Anas discors</i>	3													7				8	
Lesser Scaup <i>Aythya affinis</i>																			
Grouse, Quail, and Allies																			
Black-throated Bobwhite <i>Colinus nigrogularis</i>									4										
Loons and Grebes																			
Least Grebe <i>Tachybaptus dominicus</i>							2											4	
Pied-billed Grebe <i>Podilymbus podiceps</i>					1														
Storks																			
Jabiru <i>Jabiru mycteria</i>				10									4					1	
Wood Stork <i>Mycteria americana</i>	1		16		80		12					2	70		2		1		
Frigatebirds, Boobies, and Gannets																			
Magnificent Frigatebird <i>Fregata magnificens</i>					1			1						2				8	
Cormorants, Anhingas, and Pelicans																			
Neotropic Cormorant <i>Phalacrocorax brasilianus</i>	4		45		36			3			30	8	60						150
Double-crested Cormorant (<i>Phalacrocorax auritus</i>)					2														
Anhinga <i>Anhinga anhinga</i>					16			4					2						
Brown Pelican <i>Pelecanus occidentalis</i>					1								2						
Hérons, Ibis, and Allies																			
Bare-throated Tiger-Heron <i>Tigrisoma mexicanum</i>										1									
Great Blue Heron <i>Ardea herodias</i>	1							1			1				1	2			
Great Egret <i>Ardea alba</i>	1		4	24	38		2	5	3			8	50	6	9	3	20	23	
Snowy Egret <i>Egretta thula</i>	2		11	6	27			16	21		25	25	90	15	13		5	30	

	Paradise	BelEuro	Paradise	BAL	TexMar I	TexMar2	Aquamar	Bel-Euro	Royal Maya	BAL	Paradise	Paradise	TexMar I	Cardelli	Royal Maya	TexMar 2	BAL	Aquamar	Texmar I
	2-Jun	3-Jun	25-Jun	6-Aug	7-Aug	7-Aug	8-Aug	8-Aug	8-Aug	8-Aug	9-Aug	3-Sep	3-Sep	4-Sep	4-Sep	4-Sep	5-Sep	5-Sep	5-Sep
Little Blue Heron <i>Egretta caerulea</i>	4			2	6				3			2	4	12	20		1	13	
Tricolored Heron <i>Egretta tricolor</i>	1			1	3								6	1	6				
Green Heron <i>Butorides virescens</i>	2		1	1	7		1		6		1	1			3				
Black-crowned Night-Heron <i>Nycticorax nycticorax</i>					1														
Yellow-crowned Night-Heron <i>Nyctanassa violacea</i>					1		1												
White Ibis <i>Eudocimus albus</i>			6		32				2		1	12	80	4				60	
Roseate Spoonbill <i>Platalea ajaja</i>	5		6		12				1				20		2				
Vultures, Hawks, and Allies																			
Black Vulture <i>Coragyps atratus</i>	5		3	100	20	2											6	100	
Turkey Vulture <i>Cathartes aura</i>	5	4	8	6	2	1	1	1	2			2	35				8	6	
Lesser Yellow-headed Vulture <i>Cathartes burrovianus</i>					4								8						
Osprey <i>Pandion haliaetus</i>			1																
Common Black- <i>Buteogallus anthracinus</i>				2															
Roadside Hawk <i>Rupornis magnirostris</i>								2							1				
White-tailed Hawk <i>Geranoaetus albicaudatus</i>																			
Rails, Gallinules, and Allies																			
American Coot <i>Fulica americana</i>															3				
Limpkin and Trumpeters																			
Limpkin <i>Aramus guarauna</i>					2														
Shorebirds																			
Black-necked Stilt <i>Himantopus mexicanus</i>	2			6	114	6			3		22	4				4		40	
Black-bellied Plover <i>Pluvialis squatarola</i>								5				2	6			12			
Wilson's Plover <i>Charadrius wilsonia</i>						4					10	10	100						
Semipalmated Plover <i>Charadrius semipalmatus</i>	1		5		6	30					63		6			3		6	
Killdeer <i>Charadrius vociferus</i>																			
Spotted Sandpiper <i>Actitis macularius</i>	1				8		16		3		50		4					2	
Solitary Sandpiper <i>Tringa solitaria</i>													4					2	
Willet (Tringa semipalmata)													20						
Greater Yellowlegs <i>Tringa melanoleuca</i>					50				6		4	6						6	
Lesser Yellowlegs <i>Tringa flavipes</i>					150											6			
Sanderling <i>Calidris alba</i>																			
Ruddy Turnstone (<i>Arenaria interpres</i>)						25					4	2							

	Paradise	BelEuro	Paradise	BAL	TexMar 1	TexMar2	Aquamar	Bel-Euro	Royal Maya	BAL	Paradise	Paradise	TexMar 1	Cardelli	Royal Maya	TexMar 2	BAL	Aquamar	Texmar 1
	2-Jun	3-Jun	25-Jun	6-Aug	7-Aug	7-Aug	8-Aug	8-Aug	8-Aug	8-Aug	9-Aug	3-Sep	3-Sep	4-Sep	4-Sep	4-Sep	5-Sep	5-Sep	5-Sep
Least Sandpiper <i>Calidris minutilla</i>					20	10			30		120	25	350	6		10			
Semipalmated Sandpiper																			
Western Sandpiper <i>Calidris mauri</i>					80	20													
White-rumped Sandpiper <i>Calidris fuscicollis</i>																			
Short-billed Dowitcher <i>Limnodromus griseus</i>																			
Pectoral Sandpiper <i>Calidris melanotos</i>					5														
Whimbrel (<i>Numenius phaeopus</i>)	2											2	6					4	
Long-billed Curlew																			
Gulls, Terns, and Skimmers							7												
Laughing Gull <i>Leucophaeus atricilla</i>	20		12		150							6	150						100
Royal Tern (<i>Thalasseus maximus</i>)			18						1			30	30						60
Gull-billed Tern <i>Gelochelidon nilotica</i>	2											1							
Common Tern <i>Sterna hirundo</i>	1																		
Sandwich Tern (<i>Thalasseus sandvicensis</i>)	20		1		6							4							56
Black Tern <i>Chlidonias niger</i>													1						
Pigeons and Doves																			
Pale-vented Pigeon <i>Patagioenas cayennensis</i>	5		1		7		2												
White-winged Dove <i>Zenaida asiatica</i>	1																		
Common Ground-Dove <i>Columbina passerina</i>																			2
Ruddy Ground-Dove <i>Columbina talpacoti</i>											2								
Blue Ground-Dove <i>Claravis pretiosa</i>			1																
White-tipped Dove <i>Leptotila verreauxi</i>										2									
Cuckoos																			
Squirrel Cuckoo <i>Piaya cayana</i>										1									
Groove-billed Ani <i>Crotophaga sulcirostris</i>	5			4															
Nightjars																			
Common Pauraque <i>Nyctidromus albicollis</i>										1									
Hummingbirds																			
Stripe-throated Hermit <i>Phaethornis striigularis</i>										4									

	2-Jun	3-Jun	25-Jun	6-Aug	7-Aug	7-Aug	8-Aug	8-Aug	8-Aug	8-Aug	8-Aug	9-Aug	3-Sep	3-Sep	4-Sep	4-Sep	4-Sep	5-Sep	5-Sep	5-Sep
	Paradise	BelEuro	Paradise	BAL	TexMar I	TexMar2	Aquamar	Bel-Euro	Royal Maya	BAL	Paradise	Paradise	TexMar I	Cardelli	Royal Maya	TexMar 2	BAL	Aquamar	Texmar I	
Green-breasted Mango <i>Anthracothorax prevostii</i>						2														
Canivet's Emerald <i>Chlorostilbon canivetii</i>																1				
Cinnamon Hummingbird <i>Amazilia rutila</i>			1																	
Trogons and Quetzals																				
Black-headed Trogon <i>Trogon melanocephalus</i>				1				1												
Kingfishers																				
Belted Kingfisher <i>Megaceryle alcyon</i>																1				
Woodpeckers																				
Acorn Woodpecker <i>Melanerpes formicivorus</i>			1					4				2								
Ladder-backed Woodpecker <i>Picoides scalaris</i>											1									
Falcons and Caracaras																				
American Kestrel <i>Falco sparverius</i>								1												
Aplomado Falcon <i>Falco femoralis</i>			2											1						
Parrots, Parakeets, and Macaws																				
White-crowned Parrot <i>Pionus senilis</i>											2									
Red-lored Parrot <i>Amazona autumnalis</i>											2									
White-fronted Parrot <i>Amazona albifrons</i>																				
Antbirds																				
Dusky Antbird <i>Cercomacra tyrannina</i>				2																
Tyrant Flycatchers: Elaenias, Tyrannulets, and Allies																				
Northern Beardless-Tyrannulet <i>Camptostoma imberbe</i>																				
Yellow-bellied Elaenia <i>Elaenia flavogaster</i>								2												
Ochre-bellied Flycatcher <i>Mionectes oleagineus</i>											1									
Northern Bentbill <i>Oncostoma cinereigulare</i>											1									
Common Tody-Flycatcher <i>Todirostrum cinereum</i>				1	3															
Tyrant Flycatchers: Pewees, Kingbirds, and Allies																				
Olive-sided Flycatcher <i>Contopus cooperi</i>																				
Vermilion Flycatcher <i>Pyrocephalus rubinus</i>			2																	
Great Kiskadee <i>Pitangus sulphuratus</i>																				
Boat-billed Flycatcher <i>Megarynchus pitangua</i>				1																
Social Flycatcher <i>Myiozetetes similis</i>				6	2			4												

	2-Jun	3-Jun	25-Jun	6-Aug	7-Aug	7-Aug	8-Aug	8-Aug	8-Aug	8-Aug	8-Aug	9-Aug	3-Sep	3-Sep	4-Sep	4-Sep	5-Sep	5-Sep	5-Sep
	Paradise	BelEuro	Paradise	BAL	TexMar I	TexMar2	Aquamar	Bel-Euro	Royal Maya	BAL	Paradise	Paradise	TexMar I	Cardelli	Royal Maya	TexMar 2	BAL	Aquamar	Texmar I
Tropical Kingbird <i>Tyrannus melancholicus</i>			2	6			6		4										
Fork-tailed Flycatcher <i>Tyrannus savana</i>		4	6	3															
Manakins																			
White-collared Manakin <i>Manacus candei</i>										2									
Vireos																			
Mangrove Vireo <i>Vireo pallens</i>					2														
Yucatan Vireo (<i>Vireo magister</i>)						3													
Rufous-browed Peppershrike <i>Cyclarhis gujanensis</i>																			
Jays, Magpies, Crows, and Ravens																			
Brown Jay <i>Psilorhinus morio</i>				4										2					
Martins and Swallows																			
Purple Martin <i>Progne subis</i>					20							40							
Gray-breasted Martin <i>Progne chalybea</i>			12																
Tree Swallow <i>Tachycineta bicolor</i>																			
Mangrove Swallow <i>Tachycineta albilinea</i>							8												
Barn Swallow <i>Hirundo rustica</i>					22		2		2				10	30				20	
Wrens																			
House Wren <i>Troglodytes aedon</i>				2															
Spot-breasted Wren <i>Pheugopedius maculipectus</i>																			
Thrushes																			
Clay-colored Thrush <i>Turdus grayi</i>				6					3	2									
Catbirds, Mockingbirds, and Thrashers																			
Tropical Mockingbird <i>Mimus gilvus</i>			2	7	8	2		2	3					6				1	
Wood-Warblers																			
Yellow Warbler <i>Setophaga petechia</i>									1										
Tanagers and Allies																			
Blue-gray Tanager <i>Thraupis episcopus</i>			2																
Yellow-winged Tanager <i>Thraupis abbas</i>				2								3							
Blue-black Grassquit <i>Volatinia jacarina</i>					4														
White-collared Seedeater <i>Sporophila torqueola</i>			8	24	4		4		3				4						
Sparrows and other Emberizids																			
Chipping Sparrow <i>Spizella passerina</i>																			3

	2-Jun	3-Jun	25-Jun	6-Aug	7-Aug	7-Aug	8-Aug	8-Aug	8-Aug	8-Aug	8-Aug	9-Aug	3-Sep	3-Sep	4-Sep	4-Sep	4-Sep	5-Sep	5-Sep	5-Sep
	Paradise	BelEuro	Paradise	BAL	TexMar I	TexMar2	Aquamar	Bel-Euro	Royal Maya	BAL	Paradise	Paradise	TexMar I	Cardelli	Royal Maya	TexMar 2	BAL	Aquamar	Texmar I	
Grassland Yellow Finch <i>Sicalis luteola</i>		30																		
Grasshopper Sparrow <i>Ammodramus savannarum</i>		1																		
Blackbirds																				
Eastern Meadowlark <i>Sturnella magna</i>		4						2												
Great-tailed Grackle <i>Quiscalus mexicanus</i>			6	24	22		12		10											15

15.15. Appendix 13. Wildlife Monitoring Protocol

The monitoring of wildlife is time consuming, expensive and difficult to interpret. Instead, it is proposed to use the continued existence of the wildlife corridors (Jenkins Creek, Silver Creek and Santa Maria Creek) as a proxy for wildlife opportunities.

Requirements:

- GIS capacity
- Availability of satellite imagery

Retaining GIS expertise is not practical for the individual farms. Instead it is suggested that the Belize Shrimp Growers Association hires a GIS consultant on an annual basis to monitor:

- Biological Corridors/Riverine Buffer zones
- Mangroves
- Coastal Barriers.

The basis should be at a minimum of a resolution of 30m (Landsat) but can be at a higher resolution when available using an ArcGis or similar platform.

Baseline data with the existing extent of the investigated features can be obtained from <http://www.biodiversity.bz/mapping/warehouse/>

The results are to be presented in a report to the BSGA and published on the BSGA's website.

15.16. Appendix 14. Complaint Resolution Policy Framework

Complaint Resolution Policy Framework (CRPF),

Draft September 9, 2014

FARM:

Telephone number:

Email address:

BSGA website:

CRP officer:

Purpose

The Complaint/conflict Resolution Policy Framework(CRPF) intends to ensure mutually fair and open negotiations between the shrimp farm(s) and stakeholders.

General information

Each farm has a Complaint/conflict Resolution Policy Framework (CRPF). Each CRPF has to clearly shown the version and date the policy was last updated.

Each farm will have a sign at their gate stating a contact number by phone and an email address

Each farm will have complaint forms available at the office and/or entrance gate to report a complaint.

Each farm has a designated employee and an alternate, which are trained to take down a complaint.

This CRP contains information how and where the complainant can report the complaint/conflict, how the farm is going to address them, and expected timeline for a first response to the complaint.

The contents of the CRPF are distributed as a hardcopy amongst the village councils of the immediately surrounding communities directly affected by the presence of the farm(s) and their operations. Local government representatives, Civil Society Organizations in the area, also have a hardcopy on file. It is also available on the farm's page on the Belize Shrimp Growers Association's website as an electronic copy. The electronic copy is made available to all neighbouring landowners from whom a working email was available or sent as a hardcopy to the latest known mailing address as registered mail.

Each farm will have an individual page on the shared BSGA website, and on that page, farms will publish a list of stakeholders and others who have received a hardcopy of an electronic format from the respective farms.

The Grievance Process

Complaints/conflicts have to be documented by the complainant: description of the event, location (precise description or map and/or GPS coordinates), pictures if available, witnesses if present, and duration of the event as far as known. Non-documented events cannot be filed.

Complaints/conflicts resulting from the operations of a particular shrimp farm will be addressed by the farm in question. If the complainant is not satisfied by the farm's response, a third party mediator will be requested to mediate in the dispute. Both farm and complainant have to agree on the mediator, that has to be an individual or entity that is knowledgeable about the topic. The outcome of this mediation is binding.

Complaints/conflicts that are clearly caused by the actions of more than one farm or maybe caused by actions of unrelated parties will be addressed by the BSGA. The BSGA will form a committee of at least three members who will investigate the matter. The committee will convene a meeting with the complainant to inform the complainant about the findings of the first investigations. The complainant may seek advice from a third party who maybe present during this meeting. When the response of the BSGA committee is not acceptable to the complainant, the case will be submitted to a multi-sectorial commission with representatives of appropriate background, and governmental entities. Both BSGA and complainant have to agree on the composition of this commission, which should consist of at least three members. The outcome of this mediation is binding to both parties.

Individual shrimp farms and the BSGA maintain a complaint register, all complaints, resolved and pending are included in this register. This register is available to the general public upon request.

All correspondence, findings, reports, meeting transcripts will be made available to the complainant, either as a hardcopy or as an electronic document

Meetings with stakeholders

The shrimp farm will convene meetings with local communities and neighbouring landowners twice a year. In case absentee landowners are not able to attend the meeting, the farm will email/mail the land owner a copy of the agenda to which the owner can respond. This email correspondence has to be filed with the proceedings of the community meeting.

The meetings will be locally announced at least one week before the gathering.

Proceedings of the meeting have to include:

- name and contact information from the attendants
- date, place, venue, time start and end of the meeting

- agenda: includes at least the presentation of resolved conflicts, un-resolved conflicts and any new conflicts (if any)
- actions: agreed action plan to address pending and new complaints

Proceedings of the meeting will be circulated as a hardcopy to the village council(s) and electronic copies to all attendants and other stakeholders. Comments can be made and will be added to the minutes.

TABLE 7. COMPLAINT REPORT FORM

File number	NAME FARM: REPORTING OF THE COMPLAINT	Initials
Date complaint was heard/received		
Name of the person who reported the complaint		
<ul style="list-style-type: none"> • Postal mailing address 		
<ul style="list-style-type: none"> • Telephone number home 		
<ul style="list-style-type: none"> • Telephone number work 		
<ul style="list-style-type: none"> • Mobile phone 		
<ul style="list-style-type: none"> • Email address 		
Way claimant prefers to be contacted		
Position of the person (private or representing an organization, community)		
Name of the Conflict Resolution Policy (CRP) employee of the farm who received the complaint		
Description of the complaint		
Specific date or period the complainant made the observations		
Location where the observations were made: if needed, provide a map of the farm and surrounding areas to indicate the locality (if appropriate)		
Witnesses 1 name:		
<ul style="list-style-type: none"> • Contact info witness 		
Witnesses 2 name:		

File number	NAME FARM: REPORTING OF THE COMPLAINT	Initials
<ul style="list-style-type: none"> Contact info witness 		
Witnesses 3 name:		
<ul style="list-style-type: none"> Contact info witness 		
Evidence available: pictures, police reports, water or soil samples, written statements? Make copies, but do not take the original documentation		
Names or description of any shrimp farm personnel involved in the complaint:		
<ul style="list-style-type: none"> Person 1: 		
<ul style="list-style-type: none"> Person 2: 		
<ul style="list-style-type: none"> Person 3: 		
Date and signed by complainant:		
Date and signed by RCP employee:		

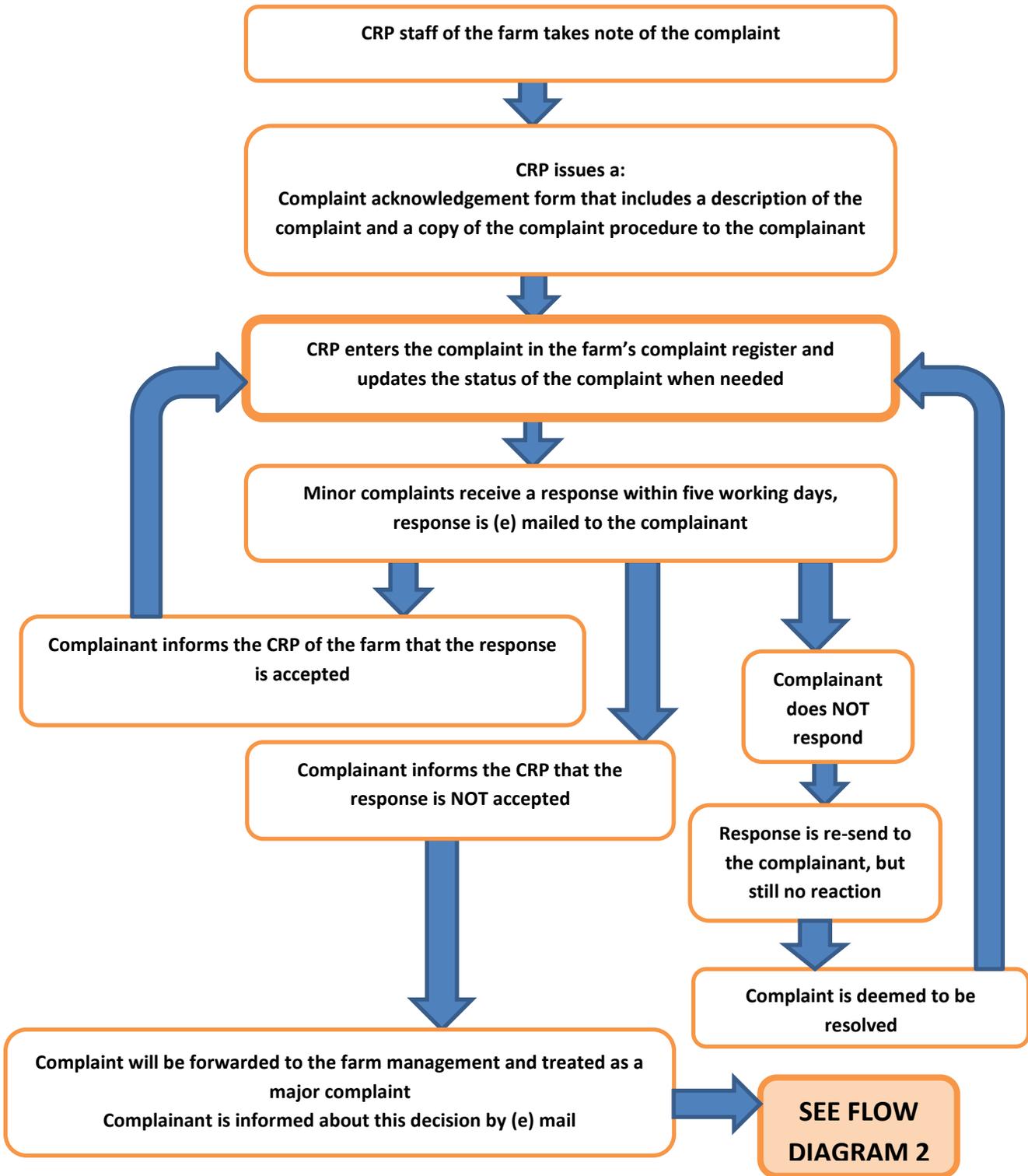
TABLE 8. COMPLAINT INVESTIGATION FORM

File number	COMPLAINT INVESTIGATION	Initials
	Date complaint was filed	
	Staff member that made first investigation of the complaint	
	Date of the first investigation	
	Description of the first investigation	
	Conclusion of the first investigation	
	Is there a need for further investigation? Explain the need:	
	Outcome of the first investigation shared with the complainant: <ul style="list-style-type: none"> • Date: • Way of communication 	
	Complaint resolution was accepted by the complainant	
	Proof of acceptance	

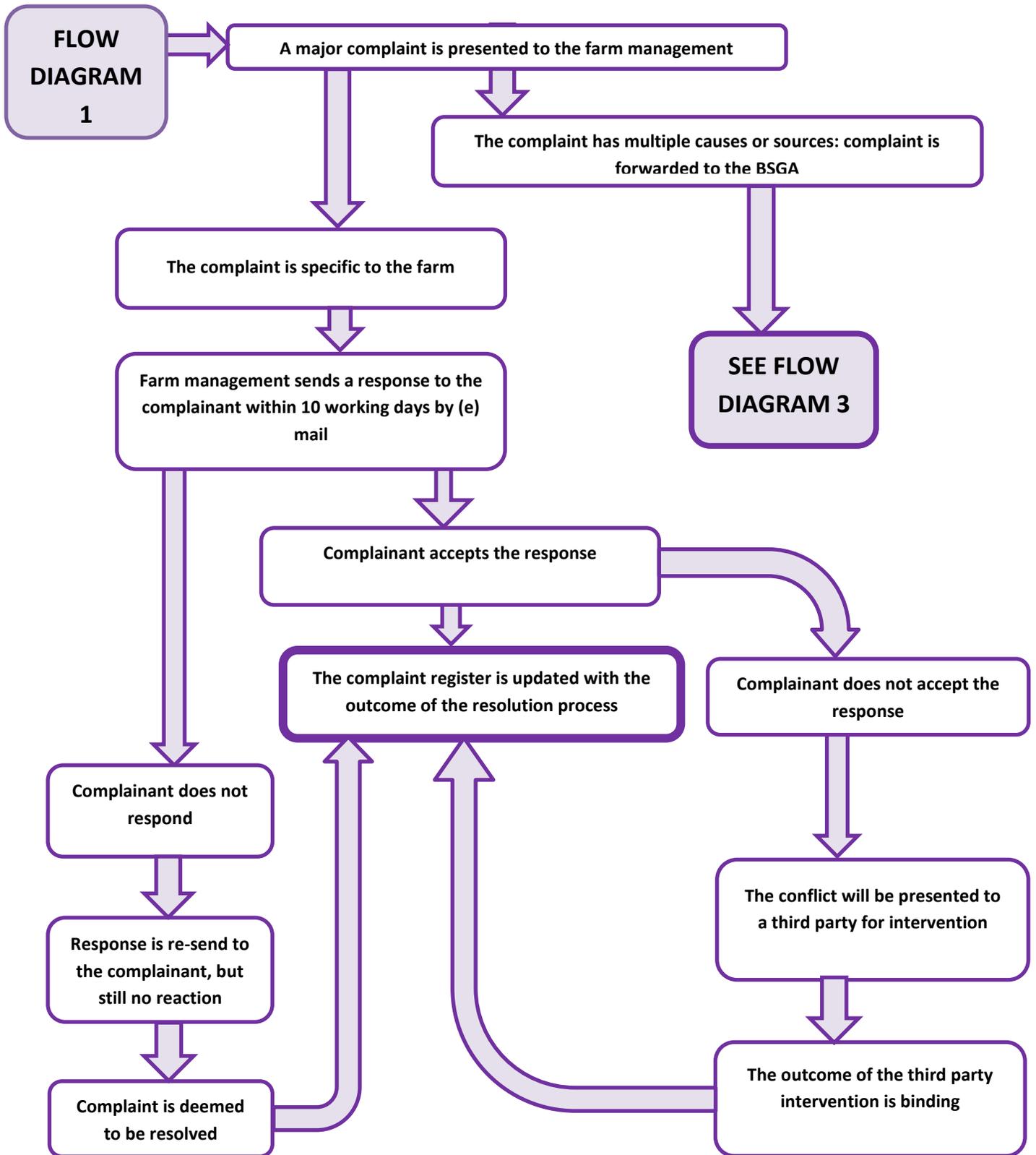
TABLE 9. APPEAL PROCEDURE FORM

File number	Appeal procedure	Initials
	Complaint resolution was not accepted by complainant on date:	
	Reason why the resolution was not accepted:	
	Which third part was proposed by farm and complainant to mediate in the appeal procedure?	
	When was a meeting held between the third party, the complainant and the farm?	
	When and how were the minutes of this meeting shared between the parties?	
	Attach a copy of these minutes to this complaint file	
	What is the proposed timeline of the response by the third party?	
	What was the proposed resolution of the conflict?	
	Based on the outcome of the mediation, what is/are the next step(s) to resolve the conflict?	

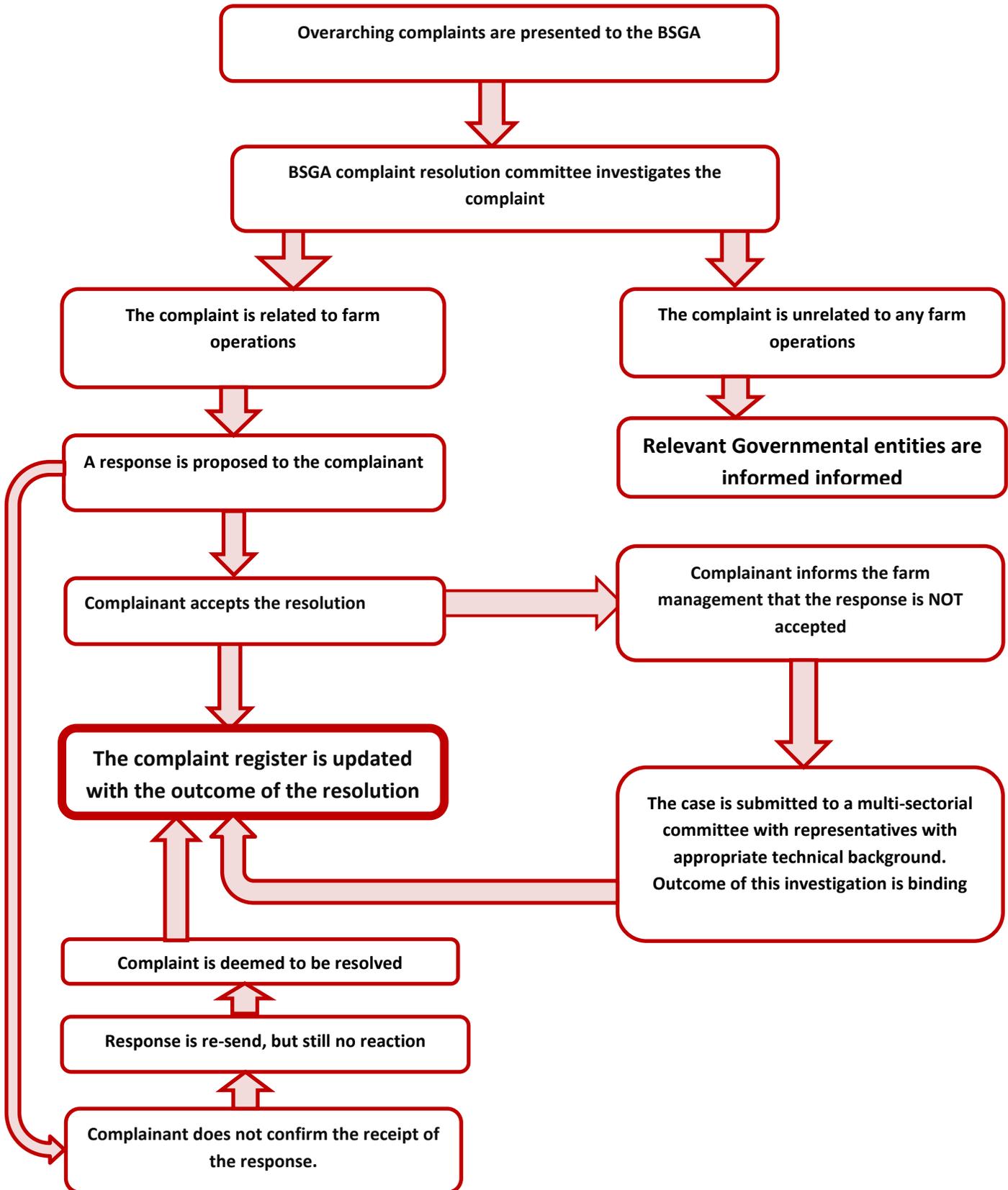
FLOW DIAGRAM 1: MINOR COMPLAINTS



FLOW DIAGRAM 2: MAJOR COMPLAINTS



FLOW DIAGRAM 3: COMPLAINTS FILED WITH THE BSGA



15.17. Appendix 17. Sequence of activities¹⁵

Month	Day	Farm	Meeting with	Purpose
April	29	Aquamar	Dean Forman	Shrimpfarms initial visits.
April	29	BAL	David Fleming	Shrimpfarms initial visits.
April	29	Cardelli	Linda Thornton	Shrimpfarms initial visits.
April	29	Royal Mayan	Alvin Henderson	Shrimpfarms initial visits.
April	29	TAI	Hezron Cadle	Shrimpfarms initial visits.
April	29	Texmar I	Anthony	Shrimpfarms initial visits.
May	13	BAL	SGA meeting at BAL conference room	Shrimpfarms initial visits.
June	3	Bel-Euro		General data collection
June	3	BAL		General data collection, general data collection
June	3	Aquamar		General data collection, general data collection
June	3	Aquamar		General data collection
June	3	Royal Mayan		General data collection, general data collection
June	23	BAL	Isabelle Gayot, Andre Reneau	Interview farm management
June	23	Aquamar	Dean Forman	Interview farm management
June	24	TAI	Hezron Cadle jr, Liza Linarez	Interview farm management
June	24	Cardelli	Linda Thornton	Interview farm management
June	24	Royal Mayan	Jessica	Interview farm management
June	24	Bel-Euro	John Sansone	Interview farm management
June	25	BAL	Andre Reneau	General data collection
June	26	Cardelli		General data collection
June	26	Royal Mayan		General data collection
June	26	Texmar		General data collection
June	26	TAI		General data collection
June	27	Bel-Euro		General data collection
June	27	Aquamar		General data collection
July	2	All farms		Overflight all farms

¹⁵ This does not reflect any e-mail and phone communications

July	8	TexMar	Paula Bowers, Anthony Chaplin, Mauricio Mejia	Interview farm management
July	15	SEA	Abigail Garbutt	General discussion Placencia Lagoon water quality and shrimp farms
July	15	Independence		Community meeting
July	16	Santa Cruz, Stann Creek		Community meeting
July	21	Placencia		Community meeting
July	22	Seine Bight		Community meeting
August	6	BAL	Andre Reneau	Fieldwork, urge to respond to questionnaire
August	7	Texmar I&II	Appointment with Anthony, but was absent	Fieldwork, urge to respond to questionnaire
August	8	Aquamar	Dean Forman	Fieldwork, urge to respond to questionnaire
August	8	Bel_Euro	Appointment with John Sansone, but was absent	Fielwork, check on property map
August	8	Bel_Euro		General data collection, general data collection
August	8	Royal Mayan	Jessica	Fieldwork, update on status of report
August	21	Coordinator Rural Development	Ernest Banner	Interview
August	21	WWF	Mauricio Mejia	Work meeting
September	3	Texmar I&II	Paula Bowers, Anthony	Fieldwork + check whether any clarification was needed on the draft BEIA/PSIA and whether there were any comments. Feedback received
September	4	Cardelli	Linda Thornton	Fieldwork + check whether any clarification was needed on the draft BEIA/PSIA and whether there were any comments. Feedback received
September	4	TAI	Hezron Cadle	Fieldwork + check whether any clarification was needed on the draft BEIA/PSIA and whether there were any comments. Draft was received but not studied as yet

September	4	Royal Mayan	Jessica, Alvin Henderson	Fieldwork + check whether any clarification was needed on the draft BEIA/PSIA and whether there were any comments. Extensive feedback received
September	4	Texmar		Fieldwork from Cardelli side
September	5	Aquamar	Dean Forman, Michael Dunker	Fieldwork + check whether any clarification was needed on the draft BEIA/PSIA and whether there were any comments. Extensive feedback received
September	5	Bel_Euro	John Sansone	Fieldwork + check whether any clarification was needed on the draft BEIA/PSIA and whether there were any comments. Some feedback received
September	5	BAL	Isabelle Gayot, Andre Reneau	Fieldwork + check whether any clarification was needed on the draft BEIA/PSIA and whether there were any comments. Feedback will be sent in over the course of coming week
September	8	DoE	Anthony Mai, Jorge Franco	Presenting draft chapter environment and discussion
September	8	Department Rural Development	Ernest Banner, Hilbert Lopez	Presenting draft chapter rural development and discussion
September	25	All shrimpfarms (except Bel-Euro and TexMar)	IDB representative, Mauricio Mejia	Work meeting
October	30	Santa Cruz, Stann Creek	villagers, Isabelle of BAL, Mauricio mejia	Presentation draft B-EIA/p-SIA report to the community
November	4,5	Independence, Seine Bight, Placencia	Communities, Shrimp farmers	Presentation draft B-EIA/p-SIA report to the community

15.18. Appendix 17. CV'S of B-EIA & p-SIA team

NAME:	JAN CORNELIS MEERMAN
ADDRESS:	P.O.Box 208, Belmopan, BELIZE. (Location: 8 mile Chiquibul Road, Cayo District, Belize) Tel/fax. 501-834-4017 mobile: 605-5706 meerman@btl.net or meerman@biological-diversity.info Websites: http://www.biological-diversity.info and http://www.biodiversity.bz http://www.green-hills.net
BORN:	30-VIII-1955
SEX:	Male
NATIONALITY:	Dutch. Belize resident since 23 August 1989. Permanent Residency card 8302/90 issued 17-VII-1990.
EDUCATION:	AGRICULTURAL UNIVERSITY of Wageningen, the Netherlands: Bachelors (HBO) in Biology. 1979 Bachelors (HBO) in Ecology. 1980 UNIVERSITY OF AMSTERDAM, the Netherlands: Literature propadeuse. 1986
LANGUAGES	ENGLISH - Fluent DUTCH - Fluent SPANISH - Conversational GERMAN - Conversational
PROFESSIONAL EXPERIENCE IN CENTRAL AND SOUTH AMERICA	July 1989 - July 1994. INTERNATIONAL TROPICAL CONSERVATION FOUNDATION. UK/Switzerland; Manager of Shipstern Nature Reserve, Corozal district, Belize. Overall responsibility for management of 8,000 hectare private reserve, including: conservation management, financial management, staff training, baseline research, liaison with local population and Government of Belize; educational activities and tourism activities. From 1994 on- Director of Belizean non-profit organization: Belize Tropical Forest Studies, focusing on biodiversity study, data management and data distribution. From 1996 on- Director Green Hills Butterfly Ranch and Botanical Collection. A private enterprise focusing on live butterfly display, captive breeding of native butterfly species for display (tourism), export and research: http://green-hills.net From 1994 on- Director of Belize Environmental Consultancies Ltd. Specializing in environmental consulting including Environmental Impact Assessments, Rapid Ecological Assessment, Biodiversity, Conservation, Land use planning, Natural Resource Management, GIS, Remote Sensing.

OTHER

International Expeditions lecturer at Rainforest Workshops in Iquitos, **Peru** and Belize 1997 - 2003.

Year 2000 Recipient of "*Leontides rosalia*" award of Milwaukee County Zoological Society, **USA** for contributions to conservation.

Participant in CITES training workshop for Scientific Authorities, Managua, **Nicaragua**, 16-19 September 2002.

Lecturer in Biodiversity Informatics Seminar organized by INBio (**Costa Rica**) in Belize City 28-29 August 2003.

Co-founder of Biodiversity and Environmental Resource Data System for Belize (BERDS) <http://www.biodiversity.bz>. A spatially enabled, web-based data bank for Biodiversity and Natural Resource information. Partnering in this effort with TransNatura LLC: <http://www.transnatura.com/>

ESRI Classroom Instruction: Building Geodatabases 1, Building Geodatabases 2. September 1&3, 2004.

Participante-Expositor en el Congreso Mesoamericano de Areas Protegidas. Managua, **Nicaragua**. 10-14 March 2003.

Participant in Symposium "Integracion de las metodologias de monitoreo de la diversidad biologica en los paises Mesoamericanos" (Sociedad Mesoamericana para la Biologia y la Conservacion). Managua, **Nicaragua** 15-19 November, 2004.

Participant in CITES Scientific Committee meeting, Managua, **Nicaragua**, 20-23 September 2005.

Participant at FAO-UNEP Global Land Cover Network (GLCN) awareness and training workshop "Mapeo de Cobertura Terrestre", San José, **Costa Rica**, 5-9 December 2005.

Co-organizer Belize GIS-day event. November 16, 2005. Galen University. Belize.

Technical Training: "Detección de cambios con sensores remotos" El Colegio de la Frontera Sur Y Conservation International. San Cristóbal de las Casas, Chiapas, **México**, 5-16 March 2007.

Member Core Planning Team Technical Assessment Maya Mountain Massif. Government of Belize / The Nature Conservancy. 2007-2008.

Expert at Inter American Biodiversity Information Network Ecosystem Thematic Network workshop, In Panama City, March 26-29, 2007. Panama City, **Panama**.

Member of the Belize National Spatial Data Infrastructure Working Group. Ministry of Natural Resources - 2011 - 2011

Member of the CITES Scientific Committee - Forest Department, Ministry of Natural Resources. 2012 -

<p>OTHER Continued</p>	<p>Past Chairman of the Board of the Belize Raptor Research Institute http://belizeraptorresearch.com/</p> <p>Savanna Ecosystem Assessment University of Edinburgh. To increase available data and enhance the capacity of local institutions to undertake taxonomic research and mapping required to identify priority areas for conservation within savannas. Ecosystem and GIS studies. Partner: 2009 – 2011.</p> <p>Founding member of the International Geospatial Society (Global Spatial Data Infrastructure GSDI). 2009.</p> <p>Certification: Teledección aplicada: Clasificación de cobertura forestal de Centroamérica mediante imágenes RADAR y ópticas. Cathalac-Panama City, Panama. October 18-21, 2011.</p>
<p>SPECIFIC PROJECTS:</p>	<ul style="list-style-type: none"> - Belize Forest Department. Rapid Environmental Assessment of the Upper Mullins River Basin. February 1994. - Lead Consultant for HWATCHY limited Environmental Impact Assessment for the Peccary Hills residential subdivision. 1994 - Consultant for the NARMAP National Protected Area Management Plan. 1994/95. - Monitoring of the reconstruction of the Hummingbird Highway 1995. - Belize representative on International Workshop "Institutional Development for Biodiversity Management" in Costa Rica. 1995. - Consultant for Belize Center for Environmental Studies, Preparation of the updated Belize Country Environmental Profile. 1995. - Consultant for MottMcDonald, for the Las Sierritas Quarry site EIA (Southern Highway Project) 1997. - Consultant for Sir William Halcrow & Partners Ltd. Ecological component of the Second Macal Crossing (San Ignacio). 1997. - Consultant for United Tropical Aquatics for ecological component of Beaver Dam Development (Cayo district). 1997. - Belize Representative on Maya Forest Biodiversity Monitoring Workshop. Mexico, Guatemala and Belize. Flores, Peten, Guatemala. September 28 - October 3, 1997. CONAP-MAB/TED-SI/MAB-WCS-CCB/Stanford. - Coordinator for Belize Enterprise for Sustainable Technology. In "Monkey River Biodiversity Study". 1995. - BRASS-EI Pilar tourism and Maya Flora and Fauna project development. Rapid Ecological Assessment. 1996 - 1997.

SPECIFIC
PROJECTS

CONTINUED:

- Biological assessment of the Columbia River Forest Reserve, Little Quartz Ridge. Toledo district, Belize. Forest Planning and Management Project / Conservation International. Feb. 1997.
- Biological assessment of the Columbia River Forest Reserve, Compartment 33, sub-compartment 2. Forest Planning and Management Project. June 1997.
- Consultant for Belize Electric Company Ltd: Wildlife monitoring of the Mollejon hydro project. 1998.
- Consultant for ESTAP: "Review of Natural Vegetation and Associated Habitats in the Southern Region of Belize". 1998-1999.
- Consultant for Sir William Halcrow & Partners Ltd./ Ministry of Works, Ecological component of Orange Walk Town by-pass. 1999.
- Consultant for Sir William Halcrow & Partners Ltd./Ministry of Works. Guatemala Link Road – Feasibility Study. Report to Halcrow Group Ltd.
- **Consultant for Belize Electricity Ltd.: Baseline data for Environmental Impact Assessment Chalillo Hydro project. 1999.**
- Consultant for ESTAP: "Ecological and Economic review of the Wetlands of the southern Stann Creek District". 1999.
- Consultant for the Central American Ecosystems Mapping project by CCAD, the World Bank and the Government of the Netherlands. 1999 –2001. Principal author of Ecosystems Map of Central America: Belize. Meerman & Sabido, 2001. 2 volume report: <http://biological-diversity.info/Ecosystems.htm>
- Design, implement and supply with living butterflies a 6 month butterfly exhibit "Butterflies: Living Jewels of the Mundo Maya" at the Milwaukee County Zoo, Milwaukee, Illinois, USA. 2000.
- Consultant for Sir William Halcrow & Partners Ltd. Ecological component of Urban Infrastructure Project. 2000.
- Consultant for Sir William Halcrow & Partners Ltd. Ecological component of Belize City Limits Study. 2000
- Lead consultant for Programme for Belize in the Feasibility Study for the Proposed Northern Belize Biological Corridor. A World Bank funded project. 2000- 2001
- Lead consultant "Base Line Diagnosis On The State Of Research On Biodiversity In Belize". Mesoamerican Biological Corridor Project. 2001/2002
- Consultant for British Natural History Museum [Las Quevas Branch] in co-management assessment assessments (2001):
 - Freshwater Creek Forest Reserve.
 - Victoria Peak National Monument
 - Gales Point Nature Reserve
 - Aquacaliente National Park
- Consultant for UNDP GEF/small grants programme in project evaluation:
 - Red Bank Scarlet Macaw Project

SPECIFIC
PROJECTS

CONTINUED:

- Green Reef Nassau Grouper monitoring project
 - Rancho Dolores Natural History Group Spanish Creek Conservation.
- Lead consultant Rapid Ecological Assessment Mayflower Bocawina National Park, Stann Creek District, Belize. 2002- 2003
- Lead consultant Northern Belize Land Management Strategies. Programme for Belize. 2002
- Consultant for the the Mesoamerican Biological Corridor Office: Phase II of the characterization study: Belize National Report of the Participation Planning Process. Report to the Mesoamerican Biological Corridor Office.
- Lead consultant Rapid Ecological Assessment Initiation Study, Spanish Creek Wildlife Sanctuary. 2002.
- GIS/Biological Coordinator-Consultant to Central American Ecosystems Mapping update workshop. Guatemala City, **Guatemala**. October 2002. (WorldBank/CCAD).
- GIS consultant to Belize Component of "el Proyecto Bosques y Cambio Climático en América Central" (FAO). 2002.
- Lead consultant Rapid Ecological Assessment Sarstoon Temash National Park. SATIIM, 2003.
- Consultant for Sir William Halcrow & Partners Ltd./Ministry of Works, Environmental Impact Assessment Blue Creek to Orange Walk Highway Upgrade. 2003.
- Design, implement and supply with living butterflies a repeat of the 6 month butterfly exhibit "Butterflies: Living Jewels of the Mundo Maya" at the Milwaukee County Zoo, Milwaukee, Illinois, USA. 2003. http://biological-diversity.info/greenhills_milwaukee.htm
- Lead consultant Rapid Ecological Assessment Spanish Creek Wildlife Sanctuary. (PACT), 2003 - 2004
- Lead consultant Rapid Ecological Assessment Aguas Turbias National Park. (Meso-American Biological Corridor), 2003
- Expert at Evaluación Ecorregional de las Selvas Maya, Zoque y Olmeca. Bacalar, Quintana Roo, Mexico. March 2004.
- Team Leader Work plan Design National Protected Areas Systems Strategy. (PACT), 2004
- Consultant Rapid Ecological Assessment Columbia River Forest Reserve. Y'aax' Che Conservation Trust. 2004.

SPECIFIC
PROJECTS

CONTINUED:

- Team Leader Belize Clearing House Mechanism Needs Assessment (Government of Belize: Forest Department), 2004
- Team Leader National Protected Areas System Policy and Systems Plan: Protected Areas System Evaluation. NPAPSP; 2004 - 2005. A comprehensive analysis of the existing Protected Areas in Belize making extensive use of GIS data: <http://biological-diversity.info/NPAPSP.htm>
- Trainer at the Biodiversity Monitoring Workshop for SATIIM staff and volunteers, January 19, 2005.
- Team Leader for the development of a Management Plan for Gra Gra Lagoon National Park. Ministry of Work, funded by World Bank; 2005 - 2006
- Consultant for the Study: *Zamia picta* study. Ministry of Work, funded by World Bank; 2005
- Consultant for Programme for Belize: Status of Research Needs at Hill Bank, Rio Bravo Conservation and Management Area, Orange Walk District, Belize. 2005.
- Desarrollando Capacidades Y Compartiendo Tecnología Para La Gestión De La Biodiversidad En Centroamérica; Recopilación De La Información Sobre Biodiversidad De Belice. INBIO. 2005
- Tourism Assets Assessment. Belize Hotel Association. Grant Proposal to PACT (Granted). 2005.
- Belize City Southside Poverty Alleviation Project. Environmental Consultant. Halcrow Ltd. 2005
- Lead consultant Synthesis report National Protected Areas System Policy and Systems Plan. NPAPSP Taskforce, 2005
- Educator at the GIS training workshop for Ministry of Natural Resources staff at Galen University. May 27, 2005.
- Training Workshops Biodiversity and Environmental Resource Data System for Belize (BERDS: <http://www.biodiversity.bz>):
 - Punta Gorda – YCT, TIDE, SATIIM. 29 Sept 2005.
 - Belize City – BAS, PfB. 31 Sept 2005
 - Belmopan – University of Belize. 8 Nov 2005.
 - Belize Audubon Society – Belize City, 29 June 2006.
- Preliminary Survey of Land degradation in Belize (United Nations Convention to Combat Desertification). 2005. Survey conducted using a GIS platform.

SPECIFIC
PROJECTS

CONTINUED:

- Mangrove Assessment Northern Turneffe Atoll. Belize Forest Department. 2005-2006. Including wildlife assessment, geo-spatial analysis, title research and land planning recommendations.
- Rapid Ecological Assessment Agua Caliente Wildlife Sanctuary. Agua Caliente Management Team and Belize Forest Department. 2006. Geo-spatial analysis of wildlife habitats and ecosystems.
- Management Plan Rio Bravo Conservation and Management Area: Programme for Belize 2006. Mapping timber extraction and conservation management areas based on Land System information.
- Rapid Ecological Assessment Aguacaliente Lagoon Wildlife Sanctuary. Aguacaliente Management Team 2006. Ecological Inventory of this protected area in the Toledo district.
- New River Lagoon Ecological Characterization: Programme for Belize 2006. Mapping and ecological inventory of the New River Lagoon in the Orange Walk District, Belize.
- Belize Natural Energy Ltd baseline study and EIA for oil exploration and various development activities in the Cayo District, Belize. Subcontracted by Halcrow Ltd. UK. 2006-2007.
- US Capital Energy Belize. Terms of Reference for proposed EIA in the Toledo District in Belize. 2006.
- RSM. EIA for proposed seismic activities (oil exploration) in the Rio Bravo and Gallon Jug Areas, Orange Walk District, Belize. 2006.
- Blue Sky Energy Belize. EIA for proposed Fuel Processing Facility in the Cayo District. 2007
- Key Biodiversity Areas Analysis for Belize. Geo-spatial Analysis of Biodiversity Data. Contracted by Conservation International. 2007.
- Accompanying Measures for Sugar Protocol Countries (AMSPC) Transport Infrastructure and Development Strategies Feasibility Study. Geospatial Analysis of land use data. Sub-consultant for Sir William Halcrow & Partners Ltd. on behalf of the Government of Belize. 2007.
- Environmental Impact Assessment, Action Plan and Management Plan for FMO Bank on behalf of Belize Natural Energy Ltd (BNEL). Sub-consultant for Sir William Halcrow & Partners Ltd. 2007.
- Management Plan Chiquibul Nature Reserve. Friends of Conservation and

SPECIFIC
PROJECTS

CONTINUED:

Development. 2007-2008

- Strategic Planning for the Golden Stream Biological Corridor. Contracted by Ya'ache Conservation Trust. 2007-2008
- Conservation Action Management Plan Gulf of Honduras, Belize. Contracted by The Nature Conservancy. 2007-2008
- Belize Natural Energy: Environmental Impact Assessment "Belize Natural Energy Hydrocarbon Exploitation At Never Delay/Belmopan, Cayo District, Belize" 2007-2010
- Land Use Change Detection Belize 1990-2000-2005. (Deforestation Analysis) Using remote sensing images. CEPF-Conservation International. 2008
- Monitoring and Evaluation Framework For Long-term Logging Concessions. Forest Department-The Nature Conservancy. 2008.
- Petaquilla Copper: Colon District, Panama. Vegetation characterization and mapping component of Social and Environmental Impact Assessment. (SEIA). Subcontracted by Golder Associates, Calgary, Canada. 2007-2008.
- Proyecto de Actualización del Mapa de Vegetación y Uso de la Cobertura Boscosa de Panamá. Centro del Agua del Trópico Húmedo para América Latina y el Caribe (CATHALAC). 2008 - 2009
- Protected Areas Systems Plan for St. Kitts and Nevis, Eastern Caribbean. OPAAL project. Subcontracted by EcoEngineering Limited, Trinidad and Tobago. 2009.
- Blue Sky Energy Belize. Environmental Audit for Fuel Processing Facility in the Cayo District. 2009
- Management Plan for the Chiquibul Cave, Cayo District, Belize. Lead Consultant. Friends for Conservation and Development. 2009.
- High Conservation Value Forest (HCVF) Assessment Report for: Rio Bravo Conservation and Management Area (RBCMA): Rainforest Alliance SmartWood Program. 2009
- Joint Strategy for Natural Resources Information Sharing. United Nations Development Programme. Galen University – Guard Institute. 2009-2010.
- Validation Study of the Proposed Chetumal Road extension and Bridge over the Haulover Creek. Government of Belize, Ministry of Works. 2009.
- Validation Environmental and Social Impact Study of the Southern Highway Extension to the Guatemala Border. Government of Belize, Ministry of

SPECIFIC
PROJECTS

CONTINUED:

Works. 2009.

- Integrating Protected Areas Policy And Management Into Belize's Forest Policy. Association of Protected Areas Managers/FAO. 2009-2010.
- Sarstoon Temash National Park Management Plan 2010-2015. Sartstoon Temash Institute for Indigenous Management. 2009-2010.
- Estudio De Racionalización Y Priorización Del Sistema De Áreas Naturales Protegidas De La República De El Salvador. WICE, Sheperdstown USA. 2009-2010.
- High Conservation Value Forest (HCVF) Assessment Report for: Yalbac Ranch and Cattle Company (Cayo): Rainforest Alliance SmartWood Program. 2010
- MDG Acceleration Framework with focus on Water and Sanitation Coverage in Belize in order to meet MDG-7, Target 7C. UNDP. 2010
- Environmental and Social Assessment (ESA) of the proposed Placencia sewerage treatment system. Interamerican Development Bank (IDB). 2010 – 2011
- National Land Use Policy and National Integrated Planning Framework for Land Resource Development. Formulation of a first Land Use Policy for Belize together with a Land suitability mapping system and a framework for the implementation of this Policy. Team leader. UNDP/Government of Belize. 2010 - 2011.
- Environmental Impact Assessment for Seismic and Oil Exploration activities within the Rio Bravo Conservation and Management Area, Orange Walk District, Lead Consultant. Belize. Maranco Energy Belize Ltd. 2011 - 2012.
- Support to Sustainable Urban Infrastructure Systems in Belize City – Project No: BL-T1050. Flood Mitigation Infrastructure (BL-L1013) – First Package of Civil Works – Belama 4. Social and Environmental Component. Hydroplan, Germany. 2012
- Development of a National Classification System for the Hotel and Tour Operator Sectors, Hotel Mapping, and Standards Review. GIS mapping component. Tourism & Leisure, Huechuraba, Chile / Belize Sustainable Tourism Program. 2012.
- Environmental Assessment component of Study for a Floating Offshore Terminal for Bulk Sugar in Belize” under financing of EuropeAid/FOTT/D/SER/BZ. Hydroplan, Germany. 2012 - 2013.
- Environmental Impact Assessment for an 18,000 acre Sugar Cane Development by Santander - Green Tropics in the Cayo District, Belize. 2012-2013. Completed at NEAC hearing of October 25, 2013
- Forest Cover Classification For Belize Based On 2012 Rapideye Imagery Deutsche Gesellschaft Fur Internationale Zusammenarbeit (GIZ). 2013/
- Development of Municipal Growth Plans (MGPs) for the Municipalities of Corozal, Orange Walk, Benque Viejo, San Ignacio & Santa Elena, Belmopan, Dangriga and Punta Gorda, Belize. Belize Social Investment Fund / Institute for International Urban Development 2013

- Belize; Identification and Prioritization of a National Climate Resilient Infrastructure Investment Plan. GIS specialist. Global Facility for Disaster Reduction and Recovery (GFDRR)/World Bank 2012-2013
- High Conservation Value Forest (HCVF) Assessment Report for: Yalbac Ranch and Cattle Company (Cayo): Post Hurricane Richard Update. Rainforest Alliance SmartWood Program. 2013.
- Environmental Impact Assessment for Oil Exploitation activities within the Laguna Seca Area, Orange Walk District, Lead Consultant. Belize. Maranco Energy Belize Ltd. 2013

Bio Jan Meerman

Jan Meerman holds bachelor's degrees in Biology and Ecology and specializes in environmental, biodiversity, natural resource and infrastructure topics. Particularly he has been active in areas such as information analysis, strategic planning, project design and project evaluation in Belize but also in Central America and the Caribbean. As an environmental consultant he has performed several Environmental Impact Assessments and Natural Resource Inventories as well as produced Management Plans. For Jan Meerman, data management is a critical component of nearly every assessment and planning effort. As such he has developed into one of the few GIS specialist in Belize that has contributed original datasets that are now publically available. Important among these is the Central American Ecosystems Map: Belize of which the first version was published in 2001, followed by an update in 2004, The 2005 National Protected Areas Systems Analysis; Fire Risk Assessment; Survey of Land Degradation in Belize; and; Land Use Change Detection (Deforestation) for Belize. All of these shared data are shared following a standard data sharing protocol including metadata and terms of use.

Publications and reports with reference to Meso-America.

- Brigs, V.S., F.J. Mazzotti, R.G. Harvey, T.K. Barnes, R. Manzanero, J.C. Meerman, P. Walker and Z. Walker. 2013. Conceptual Ecological Model of the Chiquibul/Maya Mountain Massif, Belize. *Human and Ecological Risk Assessment*, 19: 317-340.
- Calonje, M., & J. Meerman. 2009. What Is *Zamia Prasina* (Zamiaceae: Cycadales)? *J. Bot. Res. Inst. Texas* 3(1): 43 – 49.
- Calonje, M., J. Meerman; P. Griffith and G. Hoese. 2009. A New Species Of *Zamia* (Zamiaceae) From The Maya Mountains Of Belize. *J. Bot. Res. Inst. Texas* 3(1): 31 – 41
- Emmons, K. & J.Meerman. 1996. Insects. In: Emmons,K., R.H.Horwich, J.Kamstra, E.Saqui, J.Beveridge, T.McCarthy, J.Meerman, F.Koontz, E.Pop, H.Saqui, S.C.Silver, L.Ostro, D.Beveridge & J.Lumb. [Cockscomb Basin Wildlife Sanctuary, it's history, flora and fauna. For visitors, teachers and Scientists.](#) Orang-utan Press.
- Herrera, A., J. Meerman, J. McGill & F. Griffith, 2002. Phase II of the characterization study: Belize National Report of the Participation Planning Process. Report to the Mesoamerican Biological Corridor Office.
- Jones, H. L. & J. C. Meerman, in press. Diversity, Distribution, and Conservation Of Owls In Belize.

- Meerman, J. C. & E. Cherrington, 2005. Preliminary Survey of Land Degradation in Belize. Ministry of Natural Resources Local Government and the Environment. Belmopan, Belize. 64 pp.
- Meerman, J. C. & J. R. Wilson. 2006. Gra Gra Lagoon National Park Management Plan. Report to: Head-Project Execution Unit, Ministry of Public Works, Transport & Communications, Power Lane, Belmopan, Belize, C.A. Contract 97/2004-05 & National Parks Management Program of the Forest Department, Ministry of Natural Resources, Local Government and the Environment, Belmopan, Belize, CA. 109 pp.
- Meerman, J. C. & O. Salas. 2010. Sarstoon Temash National Park Management Plan 2010-2015. Report to SATIIM. 142 pp.
- Meerman, J. C. (ed). 2009. Environmental Impact Assessment for Belize Natural Energy Ltd. Hydrocarbon Exploitation at Never Delay (Phase 1), Cayo District, Belize. 172 pp + app.
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Nationality: Belizean

Date of Birth: 15/01/1982

Professional experience:

2012 (July 2012 to present): General Manager of Las Cuevas Research Station

- Oversee overall management of the station
- Responsible for delivery of courses to visiting students (courses: Tropical Forest Ecology, Tropical Research Methods, Protected Areas Management)

2012 to present: Adjunct professor at Sacred Heart Junior College (Natural Resource Management Program)

- Co-teacher of the following courses: Protected Areas Management, Environmental Assessment

2011 (February 2011- to present): Research Coordinator

Friends for Conservation and Development

- Coordinate and conduct biological research in the Chiquibul Forest.
- Development of Biodiversity Research, Inventory and Monitoring frameworks.
- Biological research proposal development

2009-2010: Volunteer (Programa Monitoreo de Aves, CATIE, Costa Rica)

- Conducted bird mist netting and bird banding.

2003-2008: Environmental Consultant (part time)

Belize Environmental Consultancies Ltd. and Belize Tropical Forest Studies

- Team member and field assistant in environmental impact and rapid ecological assessments: field data collection and report writing (biological component).
- Team member in protected areas management plan development.
- Conducted biological inventories.
- Belize biodiversity data base management for Belize Environmental Research

Database System (BERDS).

2006-2008: Free lance natural history tour guide.

- Conducted tours for individuals and groups interested in the natural history of Belize: birding, botany and spelunking.
- Guided scientific expeditions for the collection of flora and fauna samples.

2005–2006: Volunteer (Ducks Unlimited, Belize Chapter)

- Conducted aerial surveys of Northern Belize's wetlands to census wild migrant duck populations.
- Assisted in the preparation of end of season field report.

2001–2003; 2006–2007: Sacred Heart Primary Schools Management, San Ignacio, Cayo.

- Upper division primary school teacher.

2001: Volunteer (Friends for Conservation and Development (FCD))

- Conducted survey on local perception of the importance and conservation of the Belize River.
- Assisted in developing a visitors' nature trail at Rio Frio Cave.

Education:

- Master of Science in Management and conservation of Tropical Forests and Biodiversity (Centro Agronómico Tropical de Investigación y Enseñanza, CATIE, Costa Rica, 2010)

Master's thesis work: The influence of habitat complexity and landscape context on the biodiversity conservation value of cacao agroforests in Waslala, Nicaragua.

- Bachelor's Degree in Biological Science (University of Belize, Belize, 2005)
- Associates' Degree in Environmental Science (Sacred Heart Junior College, Belize, 2001)
- Secondary Education: Mount Carmel High School, Belize, 1999)

Language: English and Spanish

Résumé Trijntje Boomsma

Name: Trijntje Boomsma

Address: Belize Environmental Consultancies
P. O. Box 208, Belmopan, BELIZE.
Tel/fax. 501-834-4017 <meerman@btl.net>
(Location: 8 mile Chiquibul Road, Cayo district, Belize)

Born: 26-V-1954

Sex: Female

Nationality: Dutch. Belize resident since 23 August 1989. Residency card 8303/90 issued 12-VII-1990.

Education: Technical College, University of Utrecht , 1989. Master of Science degrees in Social and Physical Geography. Bachelor degree in Science.
Successfully completed the EIA course organized by the UCB in 1994-95, as well as the course "Agro environmental damage in Belize: Methods of Assessment, Control and Management" organized by CEPAT / The University of the West Indies in March 1996.

Occupations: High-school Teacher in Physics, Chemistry, Biology and Geography, 1975-1989.

Currently: Consultant in social- and physical geography topics for Belize Environmental Consultancies Ltd.

Experience: - Assistant manager of the Shipstern Nature Reserve, Corozal District, since 1989. Involving conservation, tourism, research and training. Management of 20,000-acre nature reserve.
- Assistant manager of the Shipstern Butterfly Breeding Center since 1989. Mass breeding of Lepidoptera.
- Social and Socio-economic consultant for a number of Environmental Impact Assessments throughout Belize. 1994 - present. Including residential development, tourism development, oil exploration and road development. Locations: Long Cay (Glovers Atoll), Sittee Point (Toledo), Northern Ambergris Cay, Seine Bight (Stann Creek), Gracy Rock (Belize), San Pablo (Orange Walk), Gales Point (Belize), Indian Creek (Toledo). Never Delay/Belmopan (Cayo) Etc.

- Consultant for the NARMAP National Protected Area Management Plan. 1994 – 1995.
- Belize Forest Department. Rapid Environmental Assessment of the Upper Mullins River Basin. February 1994.
- Monitoring of the reconstruction of the Hummingbird Highway 1995.
- Sub-consultant for Belize Enterprise for Sustainable Technology. In "Monkey River Biodiversity Study". 1995.
- Socio-economic Assessment of San Antonio Village, Cayo District, Belize. Slate Creek Nature Preserve. 1996.
- Sub-consultant for ESTAP: "Ecological and Economic review of the Wetlands of the southern Stann Creek District". 1999.
- Consultant for Sir William Halcrow & Partners Ltd. Social component for feasibility study Guatemala Link Road. 1999.
- Consultant for Sir William Halcrow & Partners Ltd. Social component for Environmental Impact Assessment Guatemala Link Road. 2001.
- Consultant for Sir William Halcrow & Partners Ltd. Social component for Environmental Impact Assessment Blue Creek to Orange Walk Highway Upgrade. 2003.
- Sub-consultant (social component) Work plan Design National Protected Areas Systems Strategy. (PACT), 2004
- Sub-consultant (social component) Gra Gra Lagoon National Park Management Plan. (World Bank), 2004.
- Conceptual site planning Gracy Rock Eco-tourism development. 2005.
- Belize City Southside Poverty Alleviation Project. Socio-economic consultant. Halcrow Ltd. 2005
- BEnCO: Social component of EIA prepared for "RSM Production Corporation", Seismic Activities in the Orange Walk district, Belize. October 2006
- Sub-consultant (social component) for Sir William Halcrow & Partners Ltd. Strategic Environmental Assessment prepared for Belize Natural Energy. November 2006.
- Sub-consultant (social component) for Sir William Halcrow & Partners Ltd. EIA prepared for BNE, Oil drilling at Mount Hope, Cayo district. March 2007
- BEnCo: Social Component EIA "Blue Sky Energy Inc.", Fuel processing facility in the Cayo district. April 2007

- Accompanying Measures for Sugar Protocol Countries (AMSPC) Transport Infrastructure and Development Strategies Feasibility Study. Geospatial Analysis of land use data. Sub-consultant for Sir William Halcrow & Partners Ltd. on behalf of the Government of Belize. 2007.
- Sub-consultant for Sir William Halcrow & Partners Ltd. Social Impact Assessment, Action Plan and Management Plan for FMO Bank on behalf of Belize Natural Energy Ltd (BNEL) 2007.
- Evaluation of the Activities and Impact of Belize Social Investment Fund in Respect to the Period 1996 to 2005. Sir William Halcrow and Partners Ltd. 2007
- Environmental Impact Assessment Never Delay Oil Exploitation; Socio-economic component. BEnCo. 2008-2010
- Validation Environmental and Social Impact Study of the Proposed Chetumal Road extension and Bridge over the Haulover Creek. Government of Belize, Ministry of Works. 2009.
- Validation Environmental and Social Impact Study of the Southern Highway Extension to the Guatemala Border. Government of Belize, Ministry of Works. 2009-2010.
- Environmental and Socio-economic baseline data for Environmental Impact Assessment Second River Crossing at San Ignacio Town, Cayo, Belize. Halcrow Group Ltd. 2010.
- MDG Acceleration Framework with focus on Water and Sanitation Coverage in Belize in order to meet MDG-7, Target 7C. UNDP. 2010
- Environmental and Social Assessment (ESA) of the proposed Placencia sewerage treatment system. Interamerican Development Bank (IDB). 2010
- National Land Use Policy and National Integrated Planning Framework for Land Resource Development. Formulation of a first Land Use Policy for Belize together with a Land suitability mapping system and a framework for the implementation of this Policy. Research Assistant. UNDP/Government of Belize. 2010 - 2011.
- Strengthening capacities of the Ministry of Labour, Local Government and Rural Development to efficiently address coordination priorities for Rural Water Supply and Sanitation Governance. UNDP - Government of Belize. 2011
- Applying MDG Acceleration Framework: Addressing Governance Bottlenecks to Achieve Water and Sanitation Coverage in Belize. UNDP. Technical Advisor. 2012

- Socio-Economic Impact Assessment Report *for*: Yalbac Ranch and Cattle Company (Cayo). Rainforest Alliance SmartWood Program. 2013.

Publications:

- Boomsma, T. 1994. Report to National Protected Areas Management Project.
- Boomsma, T. & S.W.Dunkle. 1996. Odonata from Belize. Odonatologica. 25(1); 17-29
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- Meerman, J.C. & T.Boomsma. 1995. False Sittee Point Biological and Physical Survey, Stann Creek district, Belize. Belize Tropical Forest Studies Publication # 2. 45 pp.
- Belize Environmental Consultancies Ltd., 1994-1999. As team member of BEnCo, Ms Boomsma was co-preparer of several EIA's during the period 1994-2007.
- Meerman, J.. C. & T. Boomsma. 1996. Rapid Environmental Assessment of San Antonio, Cayo district. Belize Tropical Forest Studies.

Short Résumé Trijntje Boomsma

Trijntje Boomsma has been a Belize resident since 1989. As a member of the Belize Environmental Consultancies group (BEnCO) she is focusing on the Socio-economic components of Environmental Impact Assessments and other studies. Obtained a Master of Science degree in Social and Physical Geography from the University of Utrecht (The Netherlands). Successfully completed the EIA course organized by the University College of Belize in 1994-95.

During the 21 years in Belize she gathered wide experience in socio-economic issues in the country. She has been working on several urban planning and socio-economic studies all over the country, in rural as well as in urban areas and during environmental and ecological reviews.